

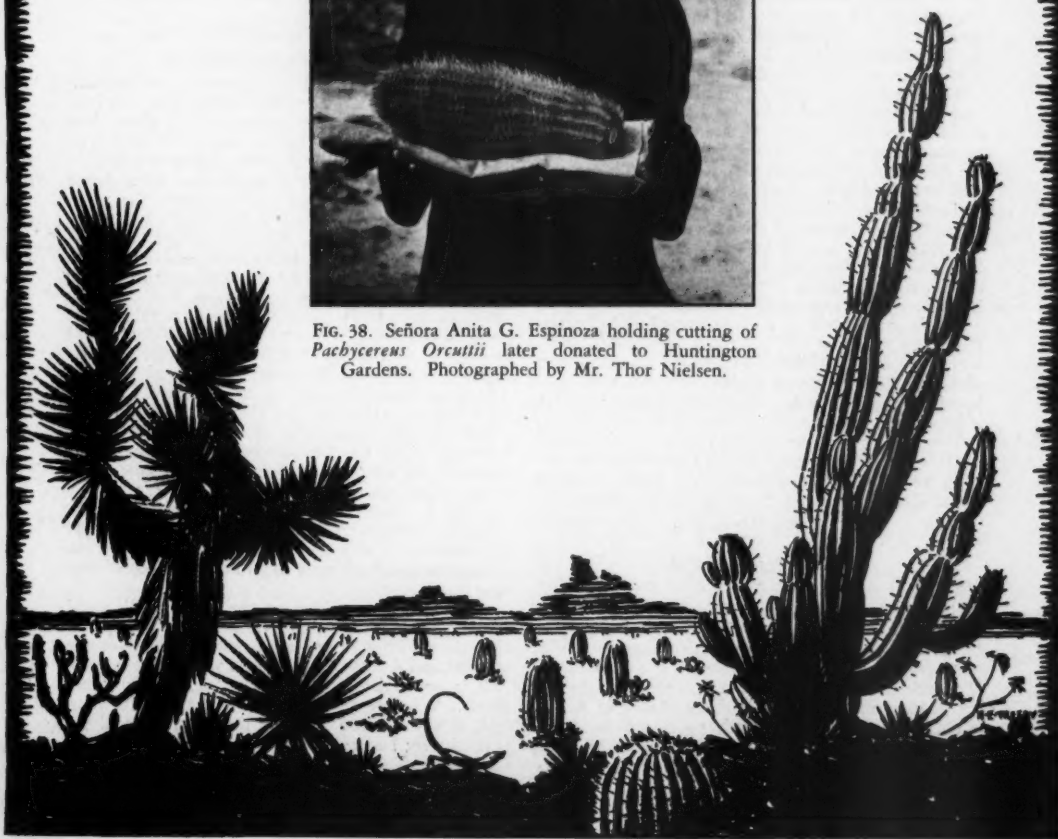
# CACTUS AND SUCCULENT JOURNAL

Of the Cactus And Succulent Society  
Of America

Vol. XXII JULY-AUGUST, 1950 No. 4



FIG. 38. Señora Anita G. Espinoza holding cutting of *Pachycereus Orcuttii* later donated to Huntington Gardens. Photographed by Mr. Thor Nielsen.



## CACTUS AND SUCCULENT JOURNAL

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**LET'S ALL GO—NOT SKY HI  
JUST MILE HI, TO DENVER, JULY 1951,  
CACTUS CONVENTION**

That's the winning slogan in the contest put on by Spine Spiel, the lively publication of the Denver Cactus and Succulent Society. It was presented by Mrs. Jennie D. Stevens of Detroit, Michigan. It's endorsed by the Denver members for they want us all there, July 10 to 12, 1951.

About the time you read this, I expect to either be at Dr. Berry's in Oklahoma discussing plans with Vice Chairman Lad Cutak or in Denver with the other members of the Convention Committee selecting meeting and lodging places. It takes much more time to plan a convention than it does to run one.

There will be a picture competition both for ordinary photographs and color work so don't pass up a chance to take a good picture. If you are not a photographer, try your hand at making up an entry for the dish garden competition. Of course both contests will be limited to cactus and succulent subjects. Rules will be published later.

Another fine feature of this convention will be several round table periods when we will split up into little groups to discuss topics of our choice. We welcome early suggestions of topics in order that capable leaders may be chosen to direct them.

Besides many good speakers and wonderful pictures, there'll be time for fun, too. The most gleeful time will probably be the initiation into the Ancient Order of Cactus Nuts. Then to please the inner man, I've heard via the grape vine, a rumor that a young buffalo is being specially fattened up for one of our banquets.

That's all for now as we don't want to take up all of Editor Haselton's space talking Convention. Meanwhile your Committee says, "Enjoy a tip-top vacation at our Convention in the Roof Garden of America."

HOWARD E. GATES, *Chairman.*

**CACTUS FUTURE IS BRIGHT**

The July 1, 1950, *Saturday Evening Post* contained an interesting article: "Is the World Getting Warmer?" Many instances were given to show that this planet is entering the regular earth temperature rise that occurs about every 2000 years. The Sahara desert is advancing three-quarters of a mile a year; ice caps are melting and the ocean is rising. Lakes in Africa are drying up; areas at both poles are decidedly warmer; Great Salt Lake in Utah is at an all time low; New York state is encountering a critical short-

age of water. The Americas are entering a dryer, warmer cycle as is evidenced in the climatic fluctuations for the last 100 years.

What does this mean to the cactus growers? Just this: Cacti will again come into its own and will be the most popular plants which are best adapted to warm dry situations. For years they have patiently waited in the sun for a chance to show their worth and the balmy climate throughout the world will better suit them and all other succulent plants. Perhaps in another 60,000,000 years cacti will outlive the Sequoias and Ginkgo trees.

**PROPER WATERING ESSENTIAL**

It's surprising to me that so many people have success with cactus considering that careful watering is so essential in the successful culture of this plant. The explanation of this success is that folks have been warned to water carefully... or the plant will die.

It is just as important to water your other house plants carefully, too. I don't mean spare the water... indeed not. But there is a right and a wrong way of watering house plants. Don't overwater to the extent that the soil becomes waterlogged and sour; neither should you go to the other extreme and allow the soil to become excessively dry, so that the earth draws away from the sides of the pot. A rule cannot be given that will hold for all plants. A study must be made of their needs. Length of time between waterings will vary with the plant, the size of pot, and depend on ventilation and on the heat and humidity condition maintained around the plant. Most people overwater rather than underwater their plants. When watering, apply a sufficient amount of water so that the entire earth ball in the pot obtains moisture. Then do not water again until the soil is fairly dry.

Light is essential for the growth of all plants. Flowering types of plants require the most light and it is best not to attempt to grow them unless you can arrange to give them at least an hour or more of sunlight every day.

If you keep your plants on the window sill, avoid chilling during very cold weather. Remove plants from the sill at night or place newspapers between the window and the plants, or protect with a paper hood.

It is essential that you have strong, healthy young plants. Whether you propagate young plants yourself, or whether you purchase them from your florist is immaterial; but make sure they are free from insects and disease.

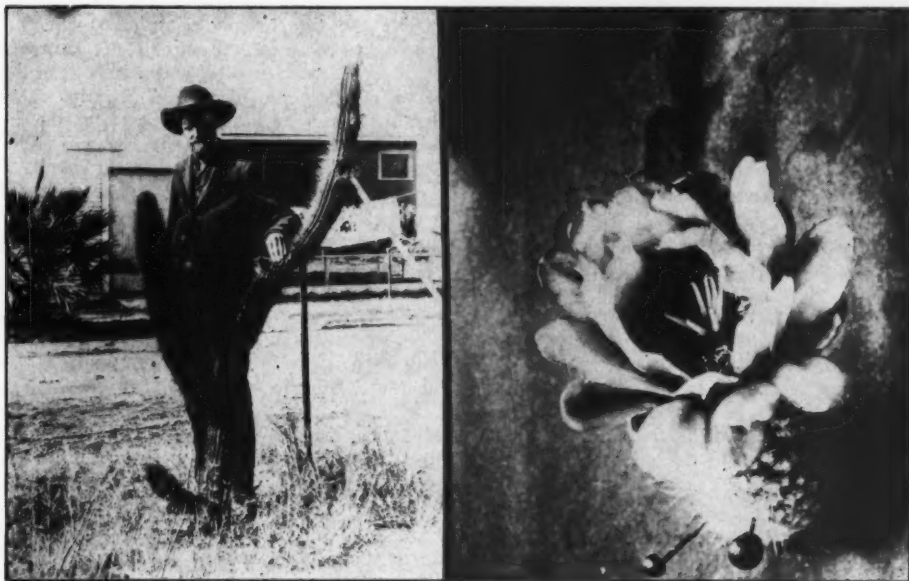


FIG. 39. LEFT: *Pachycereus Orcuttii* (K. Brandegee), Mr. Orcutt and type plant, 1905. RIGHT: Photograph of flower by Mr. C. R. Orcutt. Courtesy S. D. N. H. Museum.

## REDISCOVERY OF THE LOST SPECIES OF CACTUS, *PACHYCEREUS ORCUTTII* (K. Brandegee)

By CHARLES F. HARBISON

Señora Anita G. Espinoza, wife of Heraclio P. Espinoza, owner of a fine grocery store in El Rosario, Baja California, was successful in rediscovering in the wilds south of her village, two plants of *Pachycereus Orcuttii* (K. Brandegee) Britton and Rose. All honor should go to this kind lady for her effort and her interest in bringing back to science this long lost species of cactus. Without her cooperation it is doubtful that the plant would have been rediscovered at this time as it is apparently very rare in the wild.

This species of cactus was originally obtained by Mr. Charles Russell Orcutt, an old time resident of San Diego, California. He was editor of *West American Scientist*, an early scientific journal, official organ of the San Diego Society of Natural History; *American Plants* and many other publications. He visited El Rosario in May, 1886, and his Mexican guide is said to have collected the first branch of the plant to be seen by scientists some little distance off the trail. Mr. Orcutt brought it back to San Diego where it flourished in his garden at 21st and J Streets. In 1900 Mrs. Katharine Brandegee, a professional botanist who was then living in San Diego, saw the plant in flower. She described it

as a new species under the name of *Cereus Orcuttii* in *Zoe*,<sup>1</sup> a west coast biological journal published by Zoe Publishing Co., first located in San Francisco, later in San Diego. It now goes under the name of *Pachycereus Orcuttii* (K. Brandegee) Britton and Rose.<sup>2</sup>

Mr. Orcutt photographed his garden-grown plant and its flower in June, 1905. The San Diego Society of Natural History has a set of these mounted on heavy cardboard and marked on the back in Mr. Orcutt's own handwriting thus:

"*Cereus Orcuttii* 10 Je 1905 Type"

These original photographs were loaned to me through the courtesy of Mrs. Ethel Bailey Higgins, Curator of Botany, and copies appear in this article as figure 39.

Mr. Orcutt used these illustrations in Part II of his *American Plants* (1909). According to Britton and Rose the prints mounted on card-

<sup>1</sup>Brandegee, Katharine, "Notes on Cactaceae II" *Zoe* Vol. V, No. 1, p. 3, June 1900.

<sup>2</sup>Britton, N. L. and J. N. Rose, *The Cactaceae*. The Carnegie Institution of Washington, 1920. Vol. II, p. 70.

board like the ones owned by the Museum of Natural History, were distributed in advertising *American Plants*. The illustration of the whole plant shows that it was growing on south side of J Street between 21st and 22nd. Today, (June, 1950), one can go to this very spot and can stand where the plant was growing when the photograph was made 45 years ago. One can look across the now paved J Street and observe that the buildings in this old photograph appear today much as they did then (1905). The main difference is that the palm tree, in the parkway beside what was an old stable, has grown from a plant about four feet high to one about eighteen feet.

The last record we have of Orcutt's garden-grown plant was in 1908. At that time Dr. J. N. Rose, co-author with Dr. N. L. Britton, of the famous Cactaceae, visited the Orcutt residence. He obtained a flower and bud from the plant. These were carried back to Washington by Dr. Rose and, according to Dr. Ellsworth P. Killip of the Smithsonian Institution, are in the Herbarium of the United States National Museum. The label accompanying these specimens reads: "Vicinity of San Diego—in cultivation, May 16, 1908, J. N. Rose 12021."

The author of this article personally has canvassed the neighborhood where the cultivated plant was growing in 1905 to see if any of the old residents would remember the plant and possibly know what had become of it, but with no success. Many of the people remember Mr. Orcutt and his family but the plant apparently had not interested them. I have talked about this plant with various members of the Orcutt family, including Mr. Orcutt's widow, Mrs. Olive L. Eddy Orcutt, a wonderfully bright old lady, now in her ninety-third year. None of the family could give any information as to what had happened to the *lost cactus* until on June 4, 1950, I had a telephone conversation with Mr. Robert A. Bisbee. Mr. Bisbee, a son-in-law of Mr. Orcutt, informs me that three cuttings of the cactus were taken up to Fallbrook a number of years ago and were planted on a ranch there. Unfortunately these have disappeared. Where? What cactus fiend has them? Mr. Bisbee also stated that he had found the plant growing in the wilds of Baja California near San Agustin several years ago. He estimated that there were about a hundred plants. I am very sorry that he did not bring back specimens. Without herbarium material and photographs to substantiate the reported find the record is not established. It is hoped that Mr. Bisbee will again visit his locality and will bring back material that will prove him right.

After seeing the photographs of the *lost species* that accompany this article, Mr. Laurence M. Huey, Curator of Birds and Mammals of the San Diego Museum of Natural History, stated that he thinks he has seen this cactus on the hills on the south side of the Rosario Valley about seven or eight miles east of the mouth of Aguajita Arroyo. Many years ago he trapped mammals up in the vicinity of the cardonel near San Juan de Dios and now recalls fastening markers to specimens of this spiny cactus. This report will have to be investigated later. This would be about ten or fifteen miles north of the place where the author of this article thinks the wild plant grew from which the cutting was taken that later became the type plant.

In 1945 the author accompanied Mr. Curtis M. Brown on a moth collecting expedition into Baja California. We were searching for a species of sphinx moth, (*Euprosepinus euturpe* H. Edwards) collected near San Diego way back in 1888 by a Mr. H. K. Morrison. The describer of the species states that he had only a unique.<sup>3</sup> Two other specimens are known to science.<sup>4</sup> Mr. B. Preston Clark, a collector of sphinx moths, was anxious for us to go south into Baja California and to endeavor to capture a series of this rare insect for him. We went as far south as Arroyo del Rosarito, some 440 miles south of Tijuana. We did not find the moth but did note an interesting species of cactus growing on the hills bordering the arroyo.

Later, home again in San Diego, we were looking over some old publications and happened to see the photograph of the plant named in honor of Mr. Orcutt in his publication.<sup>5</sup> This illustration made us think of the cactus we had seen growing on the hillsides near our most southern camp at Arroyo del Rosarito. We had not collected specimens of this species of cactus for it was not in flower or fruit when we visited this locality during the latter part of March and early part of April, 1935. Could this be the *lost species*?

In March, 1938, accompanied by Mr. Allan G. Stover, a special trip was made to the region of Arroyo del Rosarito and specimens of the cactus collected. Superficially it did look like the plant of the Orcutt photograph. The spine arrangement and the flower did not agree with the Brandegee description of *Pachycereus Or-*

<sup>3</sup>Edwards, Henry, "Euprosepinus Euterpe, a New Species of Sphingidae," *Entomologia Americana*, Vol. IV, No. 2, p. 25.

<sup>4</sup>Comstock, John Adams, "A New Race of Euprosepinus phaeton from Mojave Desert," *Bulletin Southern Calif. Acad. of Science*, Vol. XXXVIII, 1949, p. 37.

<sup>5</sup>Orcutt, C. R., *American Plants*, Vol. II, p. 208.



*cuttii* however. She stated that<sup>6</sup> "spines all slender, spreading, yellowish brown, irregularly 3-seriate; radials 12 to 20, about 12 mm. long, deficient above; intermediates about 10, one-third to more than twice as long; less spreading, one of the upper spines of this row usually stouter and darker, porrect, often reaching a length of 7 cm.; centrals about 5, porrect, spreading a little longer than the intermediates."

The spines of the Arroyo del Rosarito plants were dark brown, fading to gray on the older branches. The radials and intermediates were very hard to distinguish. Fewer of these than in *P. Orcuttii*. They averaged about 15 mm. in length. They numbered about 8. The central spine usually much longer than the other spines of the areole being from 25 to 42 mm., much heavier and slightly deflexed.

According to Mrs. Brandegee<sup>7</sup> *Pachycereus Orcuttii* has flowers "greenish brown, darker outside, diurnal, entire length about 4 cm.; petals short-apiculate; ovary densely covered with short scales, almost completely concealed by thick, rounded tufts of yellowish wool, in which are imbedded dark brown bristles, 4 to 6 mm. long."

The cactus of Arroyo del Rosario has diurnal flowers, 5 cm. long, petals broadly obtuse, ovary covered with scales that show plainly since they are not concealed under wool. There are a few bristle-like spines. The plant is definitely a *Lemaireocereus*. This cactus has been going under the name of *Lemaireocereus Thurberi* (Engelmann) Britton and Rose.<sup>8</sup>

Numerous other trips have been made into Baja California since 1938, though not primarily to discover the *lost species*. Always on these trips we have kept on the alert when near El Rosario with the hopes of rediscovering *Pachycereus Orcuttii*. Many other cactophiles also have combed the vicinity for this plant but with no success. Mr. Howard E. Gates has made extensive search for the plant in the vicinity of El Rosario. Much credit is due Mr. George Lindsay for his diligent and continuous exploring of the region west of San Fernando and near Rancho San Juan de Dios. He shows a splendid map of the territory covered in this search in his article on *Pachycereus* in *Desert Plant Life*.<sup>9</sup>

<sup>6</sup>Brandegee, Katharine, "Notes on Cactae II," *Zoe*, Vol. V, No. 1, p. 3, June 1900.

<sup>7</sup>Ibid.

<sup>8</sup>Britton, N. L. and J. N. Rose, *The Cactaceae*, The Carnegie Institution of Washington, 1920, Vol. II, p. 97.

<sup>9</sup>Lindsay, George, "Giant Cacti of Lower California," *Desert Plant Life*, Vol. 14, No. 7, p. 113, Sept. 1942.

Last December 26th, two model "A" Fords carrying four men started off for a five day exploration trip into the wilds of Baja California. The objective was the plants and invertebrate animals of El Rosario. My two nephews, David M. Harbison and Clifford J. Emde went in David's 1931 automobile. Mr. Gordon A. Marsh and I went in mine. Mr. Marsh spotted a beautiful plant of *Idria columnaris* Kellogg south of highway on the hills just east of Socorro. I had past by this plant many times without seeing it. Mr. Marsh found it on this, his first trip this far south.

Arriving at El Rosario on our second day out we stopped at the Espinoza store to ask about the condition of the road south. The store proprietor, Señora Espinoza speaks English fluently. As a girl she lived in Encanto, a suburb of San Diego and attended the public schools there. As has been my custom for a number of years, I asked this lady if she had ever seen a plant like the pitahaya dulce (Mexican name for *Lemaireocereus Thurberi* or Pipe Organ Cactus) but more spiny and with yellow-brown spines. It has been my theory that the *Orcutt* species has been overlooked because of its similar growth habit to the Pitahaya dulce. Mr. Townshend S. Brandegee, the husband of Mrs. Katharine Brandegee, mentioned previously in this paper, stated in *Proceedings of California Academy of Science*<sup>10</sup> that this species, *Lemaireocereus Thurberi*, can be found as far north as San Fernando but none of the residents now living there know of any plants of it growing uncultivated in the vicinity. I also showed this most intelligent woman, Señora Espinoza, the pictures of *Pachycereus Orcuttii* in the book, *American Plants*. She said that she believed she could locate the species wanted.

The good lady called in her father-in-law and translated to him the description of the plant in *Orcutt's* book. This kindly gentleman said that many years ago he and a lad had found a very spiny pitahaya dulce? up near Aguajita. The boy set fire to the plant and it burned like a torch. He said that this plant was in the upper reaches of the valley locally known as the Arroyo de la Pitahaya.<sup>11</sup> Also he said that a second plant was growing there near the burned specimen. This seems to be the type locality of Mr. *Orcutt's* plant for in *West American Scientist*, in telling of his trip toward San Fernando

<sup>10</sup>Brandegee, Townshend S. "Plants from Baja California," *Proceedings, California Academy of Science*, Series 2, Vol. 2, Nov. 12, 1889, p. 162.

<sup>11</sup>Pitahaya is used for two other cactuses of the region. Pitahaya amarilla is *Bergerocactus Emoryi* (Engelmann). Pitahaya agria is *Macbaerocereus gummosus* (Engelmann).



FIG. 40. Base of plant of *Pachycereus Orcuttii* as observed in wilds south of El Rosario. April 4, 1950. Photograph by Mr. Gordon A. Marsh.

from Rosario on May 3, 1886, he describes this region very well. He says:<sup>12</sup>

"Engaging a boy with a pony, for a guide, at 50 cents a day, we proceeded toward San Fernando mission on the 3rd of May, leaving Rosario Valley behind. The country began to show unmistakable desert characteristics. Trees and shrubbery are not, water has leaked out, and only rattlesnakes and cactus seem to remain. Four or five unfamiliar species of chollas (*Opuntias*) were found. *Echinocactus Emoryi*<sup>13</sup> was measured and found to be eight feet from the base to the summit of the stem. Giant columnar cactuses, *Cereus Pringlei*,<sup>14</sup> stood out prominently on every side, some as much as thirty feet in height, and other cactuses like the cordwood cactus,<sup>15</sup> the cochal, Schott's cereus,

etc., were in abundance. The wild date or 'datiles,' a giant yucca<sup>16</sup> some thirty feet in height and two feet or more in diameter near the base of the trunks, here makes its most northern appearance in the peninsula. Notwithstanding the dry state of everything, some few very nice things were found along the bottom of the dry arroyo; most of interest of all was a new species *Chitonias simplicifolia*, Watson,<sup>17</sup> a small shrub that grew along the sides of the wash. *Hyptis Emoryi*, a new *Euphorbia*, various composite plants, *Verbena ciliata*, etc., were the most prominent discoveries."

"This day's journey brought us practically to the head of navigation with a team. Wagons have been a day's journey beyond, but not very recently, and the road was said to be impossible at this time. Scarcity of water and total lack of feed for the horses turned us northward at the dawn of another day, and reluctantly I bid good-

<sup>12</sup>Orcutt, C. R., "A Botanical Trip," *The West American Scientist*, Vol. II, No. 17, July, 1886, p. 58.

<sup>13</sup>*Echinocactus Emoryi*, probably Orcutt meant (*Echinocereus Emoryi*) *Bergerocactus Emoryi* (Engelmann) but a tall growing true *Echinocactus* does grow here, now known as *Ferocactus gracilis* Gates.

<sup>14</sup>*Cereus Pringlei* is *Pachycereus Pringlei* (Watson).

<sup>15</sup>Cordwood cactus is *Machaerocereus gummosus* (Engelmann). Cochal is *Myrtillocactus cochal* (Orcutt). Schott's cereus is *Lophocereus schottii* (Engelmann).

<sup>16</sup>'Datiles' is *Yucca valida* (T. S. Brandegee) described in *Proceedings, California Academy of Science*, II, 2; 208, 1889.

<sup>17</sup>*Chitonias simplicifolia* Watson hyponym *Viscainoa geniculata* (Kellogg) Green according to Ivan Johnston. *Proceedings, California Academy of Science*, Vol. 12, 1924, p. 1054.

by to the cereo (*Fouquiera gigantea*)<sup>18</sup> whose acquaintance I had but just made. This curious tree, which we found on this first day's drive southward in the greatest abundance (described in the *West American Scientist*, II, '48), was one of the most characteristic and interesting discoveries made on the whole trip."

The giant yucca, *Yucca valida* T. S. Brandegee, mentioned in the above account can still be seen growing at the mouth of a side arroyo south of highway and about 14 miles east of El Rosario. As previously stated, Mr. Orcutt did not collect the branch of *Pachycereus Orcuttii* himself. His guide brought it to him from some little distance off the trail. The guide could have reached the mouth of the Arroyo de la Pitahaya by going about 1/2 mile further up the main arroyo. A giant cardon, *Pachycereus Pringlei* is growing now just south of road at the point where the Arroyo de la Pitahaya joins the main arroyo. This arroyo runs off in a northerly direction. The guide, riding his pony could possibly have gone several miles up into this arroyo. He may have located the plant that was later destroyed and he may have collected the cutting which Mr. Orcutt carried back to San Diego from this plant.

After two days south of the village of El Rosario searching for the plant we reluctantly returned home on December 30th from our short, hurried expedition, with the promise of Señora Espinoza that she would let us know as soon as she had located the plant.

Señora Espinoza notified me by letter about the first of February of this year that she would have a specimen of the lost species of cactus at El Rosario on the tenth of that month. Would it be possible for me to come down for it? Unfortunately, because of attendance at San Diego State College, I could not go down immediately but notified the Señora by telephone that I would be down during Easter vacation. Received another letter from this wonderful Mexican friend in which she stated that I could pick up the specimen at Tijuana at a certain Señor's home. She had arranged to send up this specimen to Tijuana by one of the trucks that was passing through the village. On the sixth of March of this year, I had my first look at the rediscovered *lost species*. I was greatly thrilled.

During Easter vacation Mr. Gordon A. Marsh, Mr. Thor Nielson and I returned to El Rosario. We spent an afternoon exploring the Arroyo de la Pitahaya. Next day we drove up over the St. George Grade, reputed as being the worst in the peninsula. We drove past the intersection of the road to San Fernando and on to

San Agustín. Here we turned south by-passing El Marmol where the Mexican Onyx is quarried to Rancho Santa Inez near Catavina. Here we purchased gasoline. We spent a very happy day collecting in the vicinity of Rancho San Luis. Had a nice visit with Señor Carlos Verdugo, a wonderful and very interesting old gentleman. He told us that Pitahaya dulce was growing at San Fernando.

On our return trip we visited with Mr. Kenneth Brown at El Marmol and also stopped at San Fernando where a specimen of Pitahaya dulce was seen growing in front of a house. We asked a lady in whose yard the plant was growing if it was local and she said it was not. The cutting from which she had grown her pitahaya dulce was from the region of Bahía de los Angeles and had been planted in her yard about 12 years. A third night was spent near Aguajita where we visited the giant yucca, mentioned by Orcutt in his 1886 account, after dark and with aid of the light from a Coleman lantern, we located some fruit and foliage for herbarium specimens for San Diego Museum of Natural History.

On April 4th we returned to Rosario and accompanied by a guide suggested by Señora Espinoza, we went to the region where the two specimens of the *lost cactus* were growing. When we were approaching the spot where the plants had been located, our genial guide asked us if we could see them. We said that we could not. He then led us up and over a slight elevation and there, only a few feet away was one of the plants. This was a great thrill to both of us Americanos from Estados Unidos. Mr. Nielsen had stayed back in El Rosario.

This first plant was a thing of great beauty and very distinct from any other plant of the region. It gave one the general feeling that he was looking at a very spiny pitahaya dulce or pipe-organ cactus for the branches are of about the same thickness as are those of that species. Also this plant of *Pachycereus Orcuttii* branches from near the ground as does the other species. This *Pachycereus* has 14 to 16 ribs. Specimens of *Lemaireocereus* collected at Arroyo del Rosario in 1938 has 13 to 14 ribs. The spine arrangement and length in the two species are very different. *P. Orcuttii* has many yellowish spines arranged irregularly in three series. The Baja California *Lemaireocereus* has fewer spines, areoles are farther apart on the ribs, and is usually only one exceptionally long central spine; brown in color aging to gray.

The plant was in bud. These were quite different from any previously observed. The most mature bud was 3 cm. long and was covered on the outside of the ovary with a yellowish wool.

<sup>18</sup>*Fouquiera gigantea* is *Idria columnaris* (Kellogg).

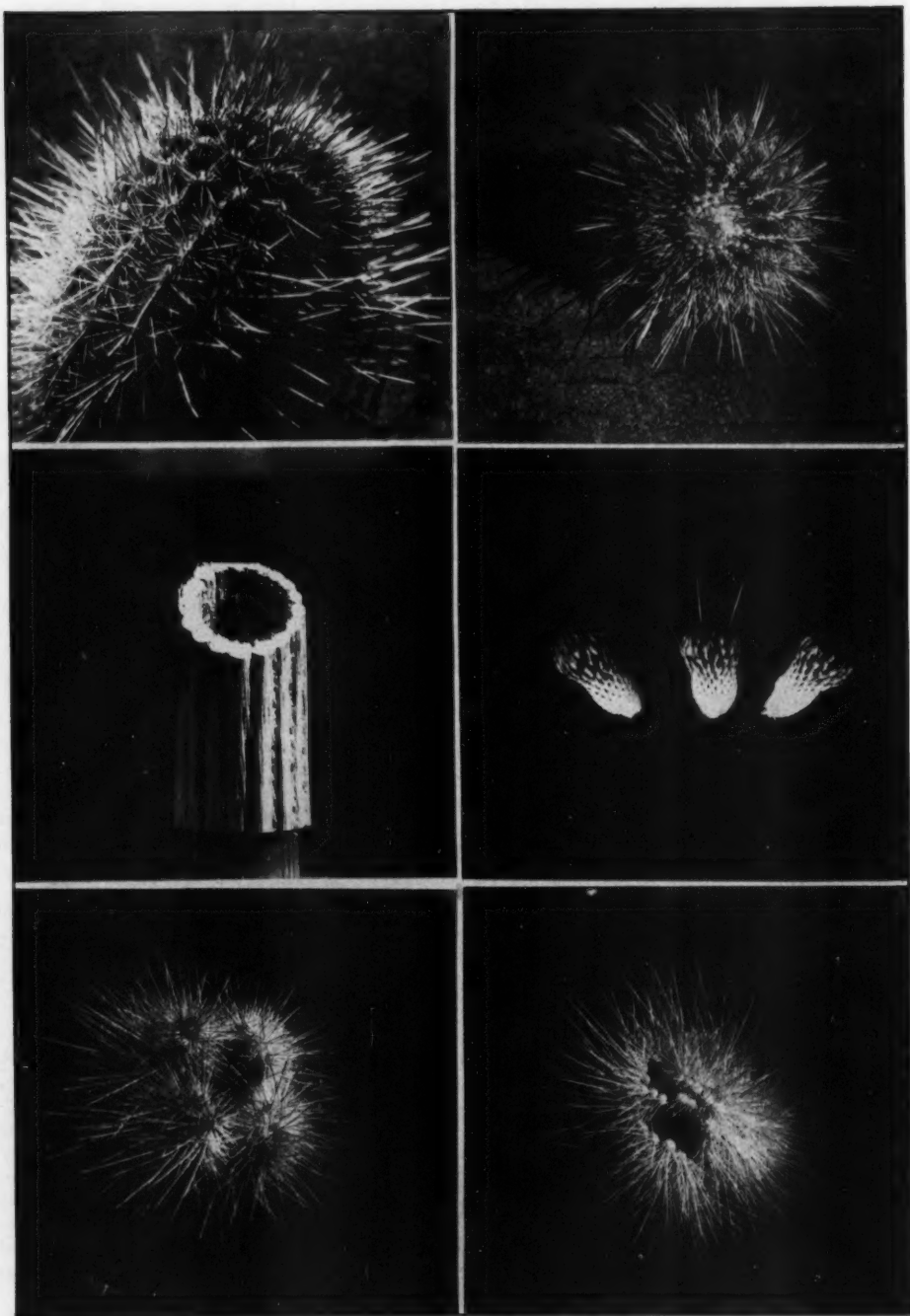


FIG. 41. TOP LEFT: Tip of branch of *Pachycereus Orcuttii* viewed from side. TOP RIGHT: Tip of Branch view from above. CENTER LEFT: Central woody cylinder-like framework from branch. CENTER RIGHT: Buds of the flower from wild plant. BOTTOM LEFT: Fruit viewed from above. BOTTOM RIGHT: Fruit viewed from below. Laboratory photographs by Mr. Lee Passmore.



Fruit of *Pachycereus Orcuttii* have never before been observed by a trained person. In the original description Mrs. Brandegee states that:<sup>19</sup> "Fruit not known."

In *American Plants* Orcutt states that:<sup>20</sup> "Fruit the size of an orange; called pitalla dulce."

I believe that this was taken from information furnished by guide as the cultivated plant apparently never fruited and Mr. Orcutt did not see the plant in the wild. In Mrs. Brandegee's article describing the plant she states that<sup>21</sup> "The guide told Mr. Orcutt that it bore in its season edible fruit the size of an orange, but it is possible that he confused it with *C. Thurberi*."

We gathered six mature fruits from the two plants of *Pachycereus Orcuttii*. Only one contained seed which have been planted and it is hoped that some will germinate. The fruit is dry and much like that of *Pachycereus pecten-aboriginum* but the fine acicular spines spread out in all directions and not just on the upper half of the fruit. The one illustrated here in figure 41 measures 5 cm. in diameter and is 5 cm. high. The yellow spines extend out 2.5 cm. beyond the surface of the fruit. The wool is in dense tufts on each sepal scale. The fruit when ripe apparently splits open. The one illustrated split along four lines. The finding of the dry fruit verifies that Britton and Rose were correct

in their placing this plant in the genus *Pachycereus*.

In addition to the desiccated last year's fruits the old dried cylinder-like framework of one of the branches was collected. The outer layer, with spines attached, of one of the branches that had died was well preserved and made beautiful flattened out specimens that showed well how the spines are arranged on the ribs. One live branch was cut up into discs about 1 centimeter thick and these dried. These show the number of ribs of the specimen and the arrangement of spines. Six herbarium sheets have been made. A complete series of the photographs taken in field and laboratory will accompany each herbarium specimen.

One complete collection will be kept in our local museum and the others will be deposited in other scientific institutions. One cutting was presented to the Huntington Gardens, San Marino, California, on May 2. Another cutting was given to Mr. George Lindsay of Lakeside, California; I understand that he plans to send this specimen to a botanic garden in Arizona. A third cutting has been planted in the author's garden in National City, California. It is hoped that these will become established and that eventually other gardens will have a specimen of this rare cactus. According to Mrs. Brandegee, "It is much the finest of the large *Cerei* of Baja California, being densely covered with bright yellowish brown spines."<sup>22</sup>

<sup>19</sup>Brandegee, Katharine, "Notes on Cactae II," *Zoe*, Vol. V, No. 1, p. 3.

<sup>20</sup>Orcutt, C. R., *American Plants*, Vol. II, p. 208.

<sup>21</sup>Brandegee, Katharine, "Notes on Cactae II," *Zoe*, Vol. V, No. 1, p. 3.

<sup>22</sup>Brandegee, Katharine, "Notes on Cactae II," *Zoe*, Vol. V, No. 1, p. 3.

#### QUINN BOTANICAL GARDEN

Guy Quinn of Olden, Texas, is developing a natural botanic garden for native plants. Native cacti will be a feature of this garden but there are already hundreds of species of hardy cacti, yuccas, and agaves. It is open to the public. During June it was reported to be a mass of wild flowers.

#### ROUND ROBINS

Mrs. Mabel Fay of 123 North Avenue, North Abington, Mass., suggests a series of Round Robins. The *JOURNAL* will cooperate if there is sufficient interest. Write to Mrs. Fay for further particulars. She says, "I like the idea of having an article: 'How Shall I Start a Collection' contributed by an amateur. I believe it would be most helpful to many of us. I shall look forward to it. However, I would like to say this—please, oh, please don't ever bring your *JOURNAL* completely down to the level of the amateur. I am sure you won't. There are articles, I know, which are over an amateur's head but that is what makes the *JOURNAL* so valuable. It is like a fine textbook or a reference book and I find it a yardstick by which to measure one's progress in the study of cacti. I go back to former issues *time and time again* and read over articles which I skimmed over the first time because I did not understand them fully and invariably I find them much clearer when I go back to them for

I have learned between times. We go through our little amateur garden magazines which are fine and so much needed, cut out an article or two for our scrapbook and then away it goes, but the *JOURNAL* is so superior to anything on the market in my estimation, that the volumes are priceless (now, don't you go up on the subscription because of what I'm saying, but I truly mean every word).

#### FROM "THE SPINAL COLUMN"

The June, 1950, bulletin of the Detroit Cactus and Succulent Society contained an interesting biography of Nathaniel Lord Britton and Joseph Nelson Rose. (Subscription to this bulletin is \$1 per year. Address Mrs. E. W. Comben, 15769 Wildemere Ave., Detroit 21, Mich.)

#### FREEPORT, ILLINOIS, CLUB

This club emphasizes the importance of visiting other members' collections for inspiration and new ideas. Anyone interested in cacti in the Freeport area should contact Mrs. A. Ottenhausen, 733 W. Elk Street, Freeport, Illinois.

Just as we were going to press we learned with regret that Dr. G. L. Berry of Lawton, Oklahoma, is confined to bed and thus his Directory will be delayed.

## RAINBOW CACTUS SETS FLOWER RECORD

By R. C. PROCTOR

Once I photographed an Arizona Rainbow Cactus with seven flowers and the published picture was suspected by a few readers of being phoney. This reaction, I now realize, was perfectly natural for at that time seven flowers on

the single stem *Echinocereus rigidissimus* was unheard of.

And here is a case I would not believe, myself, if someone else had produced a picture as the only evidence that such a thing did happen:

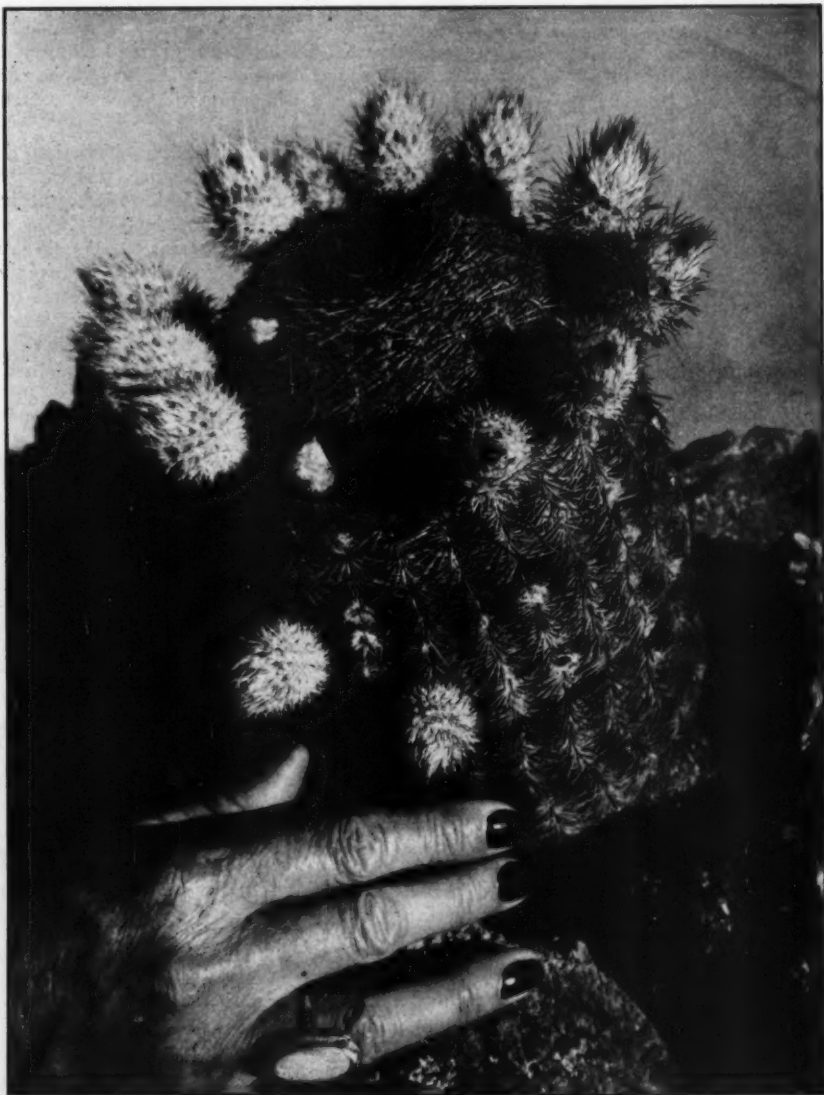


FIG. 42. The thirteen well developed buds on an *Echinocereus rigidissimus* are shown about ten days before they opened simultaneously. The stem had 17 buds but all could not be photographed from one side of the plant.

That is, a bouquet of thirteen flowers on the usually shy-blooming Arizona Rainbow; the most spectacular display of beauty I have ever witnessed in a floral creation. And unless someone can report one better I believe this sets a record for flowers of the species—on a single stem or branch of any other species within the genus *Echinocereus*.

Of course this was not a cultivated plant. It

was brought in, bearing seventeen buds, from the desert region around Nogales, Arizona, and I claim that no cactus in cultivation will produce the masses of flowers that its wild ancestors will very often do in their natural abode, at least I find this to be true with the Arizona varieties. But most collectors are intrigued with the colorful spine formation of this rainbow cactus and are happy just to keep their plants



FIG. 43. This massive bouquet, about 14 inches across almost obscures the single stem. The thirteen flowers must undoubtedly set a record for the species.

alive though they may never flower—and in spite of the fact that they are extremely difficult to grow.

However, this moody little cactus can sometimes be cured of its homesickness and can be encouraged to make the best of it in a pot or garden. At least the younger ones, about two inches high (flowering size), can be coaxed along for a few years and be made to produce a flower or two. The Mrs. and I have several scattered about the yard, perched on high ground for drainage. Some of them put forth new growth and flower a little every spring but we also lose a lot of them during the winter rains—when we have rain. Some of these plants have been with us in Arizona for many years, but we do get a few reports of good results from people who grow them in moister climates.

If you live in a moist climate, better put them in pots but before planting remove the roots and allow the stubs to heal over. Keep them in full sunshine as much as possible with a predetermined side of the pots marked, and the marked sides kept toward the south, or sunny side, at all times. During the rains, bring them indoors but place them so that the marked sides will be towards the source of light.

The soil should be practically all coarse gravel with a generous sprinkling of slaked lime mixed in. A little humus (but very little) will help to sustain a plant during its active growing period which is spring and summer when it will also appreciate a slight dampening of the soil about once a month, but they must be allowed to remain "absolutely dormant" at all other times. This is one cactus that will not tolerate water out of season, and precious little at all.

It is said that real old plants, such as the one with thirteen flowers, will immediately die off when removed from the desert—which is, sadly enough, too true—but we have kept three of the oldest and largest of them in pots for almost four years and they have produced a flower or two every spring. Two of them must be at least fifty years old, judging from the number of colored spine bands encircling the stems—if it is true that each band represents a year's growth. They are never exposed to the rains and are kept, whenever possible, in full sunshine. In the case of these old boys, who probably reached the limit of their growth long ago, it is just a matter of keeping them alive.

Of course, we succeed in keeping only about half of our plants, and we replace them from time to time, but the short while that some of them do remain alive, plus the "years" that another few have survived, is adequate compensation to us for the effort we have exerted in taking care of them.



## QUESTIONS and ANSWERS

Conducted by  
**HARRY JOHNSON**  
Paramount, Calif.

*Question:* My *Hoodia macrantha* is now about 9" tall with two side shoots but has not, as yet, flowered. I received it from you in 1941. Also my *Ariocarpus fissuratus* which I have had for ten years, does not seem to have grown, though the outer tubercles are quite green. Yesterday when I transplanted them I noticed they have a quite short root system. Are they slow growers or do they need special attention? Mrs. Joseph T. Pierce, California.

*Answer:* The Hoodias are tricky subjects to grow. Your plant with its grey green color is quite normal. To get them to flower, which they do freely, they should be fed judiciously in April or May. Your soil mixture of 1 part loam, 1 part leafmold, 1 part sand, 10% charcoal, is fine. The lime I have found is not necessary. They are quite likely to resent repotting though they can be shifted into a larger size pot if the ball is not broken. My Hoodias have been in flower for three or four months. They resent wet feet and should have good drainage, plenty of sunlight and fresh air. I have a plant of *H. Juttae* in flower now, the tops of its 3 branches each a circle of small one inch flowers. When Hoodias are really happy they are prodigious bloomers the plants being smothered in their lovely copper tinted stars. The *Ariocarpus* (Mexican Living Rock) are extremely slow in growth. Probably the ordinary plant purchased is over 25 years old. They grow well in almost pure sand with just a little leafmold. A few chunks of old plaster or mortar may make them feel more at home. I have grown them in several soil mixtures, but the sand is the safest and easiest. In late spring and summer I feed a couple of times—after they are thoroughly established. They are then in condition to flower in September. The exquisite pink, satiny blossoms appearing in the wool at the center are a real thrill.

### *Question:*

1. My *Echeveria plumosa* and *E. pulvinata* (Chenille Plant) are losing their lower leaves. Also *Echeveria Derenbergii* (Painted Lady) is rather limp. I water them when dry.

2. My *Huernias* form buds but these shrivel and never open. I have three plants in a 6 inch pot.

3. I have a small plant of Xmas Cheer which



has lost its red tips and the lower "beads" fall off. I water when dry—about every other day as it is in a 2" pot.

4. How often should I water my *Cephalocereus senilis* (Old Man) and what soil is best. It is in a 2" pot in an east window room temperature 70°.

5. My *Tephrocactus glomeratus* (Paper Spine Opuntia) is not growing. I have had it 8 months in a 2" pot. Mrs. Lorraine E. Miller, Chicago, Illinois.

**Answer:** Perhaps the most useful answer to your problems, which all stem from the same causes, is to define ones objectives. Many people primarily think of plants as ornaments in a room. Others are interested in the welfare of the plant, they want to actually master their culture and grow them into specimens. Thus the florist has presented to him an insoluble problem or at least one seldom answered by one solution. I would say that the two groups of plant buyers are about evenly divided. This is why one gets so many conflicting answers to questions. If you are a Journal reader one may safely say you belong to the second group and are more interested in growth than silhouettes.

To answer your questions on culture. The loss of leaves is due primarily to the dry air and constant warmth of the room. Tied in with this is a lack of a free flow of fresh air. Also 2" pots standing on a window ledge or shelf have great temperature fluctuations. If the sun shines on them they become very hot and rapidly dry out, killing the delicate root hairs which absorb moisture and food. Therefore I would advise using trays filled with peat moss, vermiculite or plain sand and bury the pots in this to within a quarter inch of the top. They will thus remain cool with more even moisture and not need care nearly as often. Also give them as much ventilation as one comfortably can. The *Echeverias* like partial shade in summer. Particularly the hairy leaved species. Don't let them dry out too much though they certainly don't like wetness. The *Huernias*, when they show buds, like fresh air which is generally more moist than room air. Also sunlight shining through a window has the shorter light waves of the spectrum pretty well screened out while the longer heat waves pass through easily nicely cooking the buds. Generally by the time they are ready to flower the window can be raised which solves the problems. The Xmas Cheer will turn green if watered too much or if given shade. The red color is always brightest during the cold nights of late autumn and winter. The Old Man needs a quite porous soil say equal parts of sandy loam, leafmold and

sand. The Paper Spine Opuntia needs the heat of summer to grow much and full sunlight to develop the papery white spines properly. Under your conditions try the *Gymnocalycium* (Chin Cacti) *Mammillarias*, *Parodias*, *Notocactus* most of which bloom easily.

**Question:** My *Mammillaria bocasana* flowered but did not have the red seed pods. Mr. Chas. Levy, Connecticut.

**Answer:** It may be you are a little impatient and have not given them time to appear. Also the flowers may not have been pollenized. If the blossoms open where insects do not have access to them the pollen may not get on the stigmas. One can easily remedy this by putting a dab of cotton on the end of a toothpick and gently brushing the flowers. The pods in this species appear shortly after flowering. They are most attractive, curving and crimson and up to 1½" long.

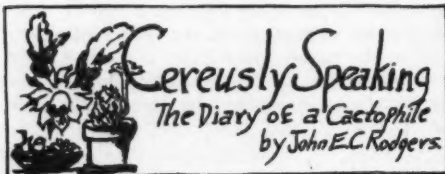
**Question:** My Split Rock turned black and rotted shortly after repotting it. Mr. Charles Meritt, Maine.

**Answer:** This was probably due to watering it after repotting. Of course they will need watering but it is generally best to pot in barely damp soil and leave them alone for a week or so. This gives the broken roots a chance to form some scar tissue to keep infection out. Water lightly just enough to stimulate some root activity. Above all give them plenty of fresh air even if the temperature is down to 40° or 50°. Fresh air is a sovereign remedy for many plant ills.

**Editor's Note:** If you want this column continued you must take a part in it. Send your questions to Harry Johnson, Johnson Cactus Gardens, Paramount, Calif.



Echinopsis with pups.



*Cochemiaea*, genus 6 of the Coryphanthaceae, contains five species which are not very well known in collections that I have visited. The two that I own, *C. poselgeri* and *C. setispina* are thickly spined with heavy hooked central spines in *C. poselgeri* and long black tipped, white hooked hair-like spines in *C. setispina*. Both plants keep on growing and branching so that the older stems of the former trail over the edge of the pot while *C. setispina* just lean.

Britton and Rose in "The Cactaceae" Vol. IV, pages 21-23, list *C. halei*, *C. pondii*, *C. poselgeri*, and *C. setispina* while Marshall and Bock in "Cactaceae," page 171, list a fifth one *C. maritima* found by George Lindsay in 1935 in Baja California. The dealers and catalogs do not list any of these five species. I bought *C. poselgeri* from Eugene Ziegler, Spencerport, N. Y., in 1935 as a seedling (he was then selling plants grown from seed imported from Fernando Schmolli). In 1943 Dr. Henry Shetrone, Columbus, Ohio, gave me a three headed *C. setispina* which he believed would do better for me than for him. This is still debatable, but I have kept it growing.

The only other *C. poselgeri* that I have ever seen in a private collection was called "Devil's Hooks" by the owner. She said that she had ordered it from a dealer but she could not recall his name. The others are too rare to become nicknamed in any collection I've visited from New York state to the Mississippi River. No doubt my plants are not the only two in captivity in this section as some may still be listed as *Mammillarias* as they do not have prominent grooves on the tubercles as on the other Coryphantha.

*C. poselgeri* and *C. setispina* have never flowered for me. The descriptions say the flowers are scarlet and resemble *Aporocactus flagelliformis* and *Zygocactus truncatus* in shape but appear from the top part of the plant. The outer red sepals stand out from the tube which give the bloom a double appearance. George Lindsay mentions that *C. maritima* flowers in the spring.

Dying back from too lean soils and not enough strong light seem to be the only draw backs I've encountered. The plants are not bothered with spine bugs or mealy bugs; I keep them with Rebutias and *Mammillarias* which have mild infestations. I keep them in full sunlight about three feet from the glass with the pots embedded in sand. The ventilators are above them as they grow best with plenty of fresh air.

The *Cochemias* are found on the peninsula and islands adjacent to Lower California (Baja California). *C. halei* is found on Magdalena Island off the south coast; *C. pondii* is found on Cedros Island off the northern coast; *C. maritima*, as the name implies, is a coastal type. *C. poselgeri* and *C. setispina* are found in the interior. This region is arid and from George Lindsay's movies shown at the 1949 Convention in Phoenix, Arizona, is what we usually think of when we say "Cactus Land."

Dr. C. A. Purpus reported that he found *Cochemias* growing best in granite gravel. Marshall and Bock recommend, "very well drained loose soil with a heavy leaf mold content. Water can be supplied liberally in

warm weather but should be used very sparingly in the cold season." I use soil from an ancient straw stack and mix it with coarse sand and gravel and a dash of old pulverized plaster. I water liberally twice a week during the spring and summer but begin to taper off in September. From then on until spring it stays dry.

My plants are under seven inches long or tall, which ever you prefer. I keep them in the greenhouse the year around but the Wellington, Ohio, collector kept hers in the window garden during the winter and on screened-in porch during the summer. As far as I can see there was no difference in growth as the plant was firm and followed the Britton and Rose description. The flowers are supposed to be larger than *Mammillarias* and *Coryphanthas* and attractive. I find both of my plants interesting as curiosities even though they do not flower.

The plant of the month is the best known of the quintet—*C. poselgeri*. It was first found in 1885 and named *Mammillaria poselgeri*. In 1899 K. Brandegee first separated the two then known species from *Mammillaria* and made them a sub-genus. The name was taken after an Indian tribe that once inhabited Lower California. My plant turns from apple green in the new growth to blue green tinged with purplish red on the older growth. No doubt because of its rarity, I've been too careful but it has survived and grown. Do not expect a beauty because it comes from a place where nature is not too kind. I like the *Cochemias* and plan to get the other three if and when I can locate them as seedlings.

JOHN E. C. RODGERS

1229 8th Street, Lorain, Ohio.

EDITOR'S NOTE: In the early Cactus and Succulent Journals, as far back as Vol. II (1930), Edgar Baxter was writing about *Cochemias* that he collected. Then in 1936 George Lindsay reported on this genus and described and pictured his new species, *C. maritima* in Vol. VIII, page 143; in 1945 he monographed the genus and reprints are still available for 50c (Box 101, Pasadena, Calif.). R. E. Willis, the first secretary of the Society, received a plant collected by Baxter in 1930; recently (1950) Mr. Willis gave me a few of his remaining plants and among them was one of Baxter's *Cochemias*, still healthy after 20 years of neglect. The plant was in an 8-inch pot in rather heavy soil and had weathered two freezes from its location underneath a pine tree!

#### TWELVE-YEAR-OLD MESEMB

In 1938 your Editor photographed a *Mesembryanthemum* growing in a box outside a real estate office (see "Succulents for the Amateur," pg. 17). This spring, on the way to Johnson's Cactus Gardens, we passed this same box-planting and was surprised to see the neglected plant struggling along after twelve years.

#### FROM EGYPT

Harry Johnson reports that there is a Cactus Association in Egypt.

#### FROM EL PASO, TEXAS

When passing through El Paso, Texas, be sure to stop and see Society member John Leasure who operates the Cactus Gardens at 4431 Montana Street. You will be interested in his new fireplace made up of hundreds of minerals and semi-precious stones as well as petrified wood and many other samples, each with a story of its own.



*Echinopsis Pentlandii* Salm-Dyck

*Plate 26*

From Blühende Kakteen—July 31, 1902.

## Rhipsalis cribrata Lem. and Rhipsalis penduliflora N. E. Br.

### Plate 27

*Rhipsalis cribrata* Lem., Illustr. hort. IV, 107; K. Sch., Gesamtbeschr., 629 (note to *R. penduliflora* N. E. Br.).

*Hariota cribrata* Lem., Illustr. hort. IV, 107.

*R. penduliflora* N. E. Br. in Gard. Chron. II, ser. VII, 716; K. Sch., Gesamtbeschr., 629.\*

As I am gradually introducing here representatives from all genera of the *Cactaceae*, two closely-related species of *Rhipsalis* are pictured in this plate although neither is generally distributed in collections. I could not review the first-mentioned species earlier for it was not present in the Royal Botanical Gardens of Berlin at the time the "Gesamtbeschreibung" was being written, and it was necessary to dismiss it with a short remark and a note to the key of *R. penduliflora* N. E. Br. Through the never-tiring assistance of Dr. Webber of Paris, the well-known member of the German Cactus Society, I am today happily able to express an opinion, due to his having sent specimens which have since grown into well-developed plants.

Both species seem very similar in their vegetative parts; from their pots or moss-baskets they produce long shoots which because of their slenderness hang down in arches; from these grow more long shoots, usually in whorls, on whose ends appear more or less numerous clusters of shorter shoots. One can scarcely find a difference between these on the two species—yet one can see that in *R. penduliflora* N. E. Br. the short end-branches carry a terminal tuft of hair which is lacking in *R. cribrata* Lem.

If the difference in these parts is small, it is more pronounced in the flowers. A glance at the accompanying plate will dispense any doubt as to the specific status of the two plants. In *R. penduliflora* N. E. Br. the flowers are much more closed, the petals erect and the color pure white. *R. cribrata* Lem. is quite distinct through its yellow-colored flowers which are much more widely opened.

Lemaire placed *R. cribrata* Lem. in the genus *Hariota*. With similar reasoning one could do likewise with *R. penduliflora* N. E. Br. Yet I do not think such an undertaking would be correct. The reason lies in the circumstance that Lemaire included in *Hariota* those *Rhipsalis* species whose blossoms were terminal; he even included in this genus the well-known *R. Saglionis* and *R. mesembrianthemoides*.

However, these species are really not distinct from *Rhipsalis* in a single characteristic, and the placing of the flowers at the ends or sides of the branches cannot be of any importance in separating genera, as here the flowers are usually always lateral and the tip of a shoot never develops into a blossom. I leave in the genus *Hariota* only those plants that, besides showing a difference between their long and short branches, are also well-characterized by their yellow flowers and short, clavate joints.

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\*Because of a misprint the name *penduliflora* is here falsely translated; in place of "with hanging leaves" should be read "with hanging flowers."

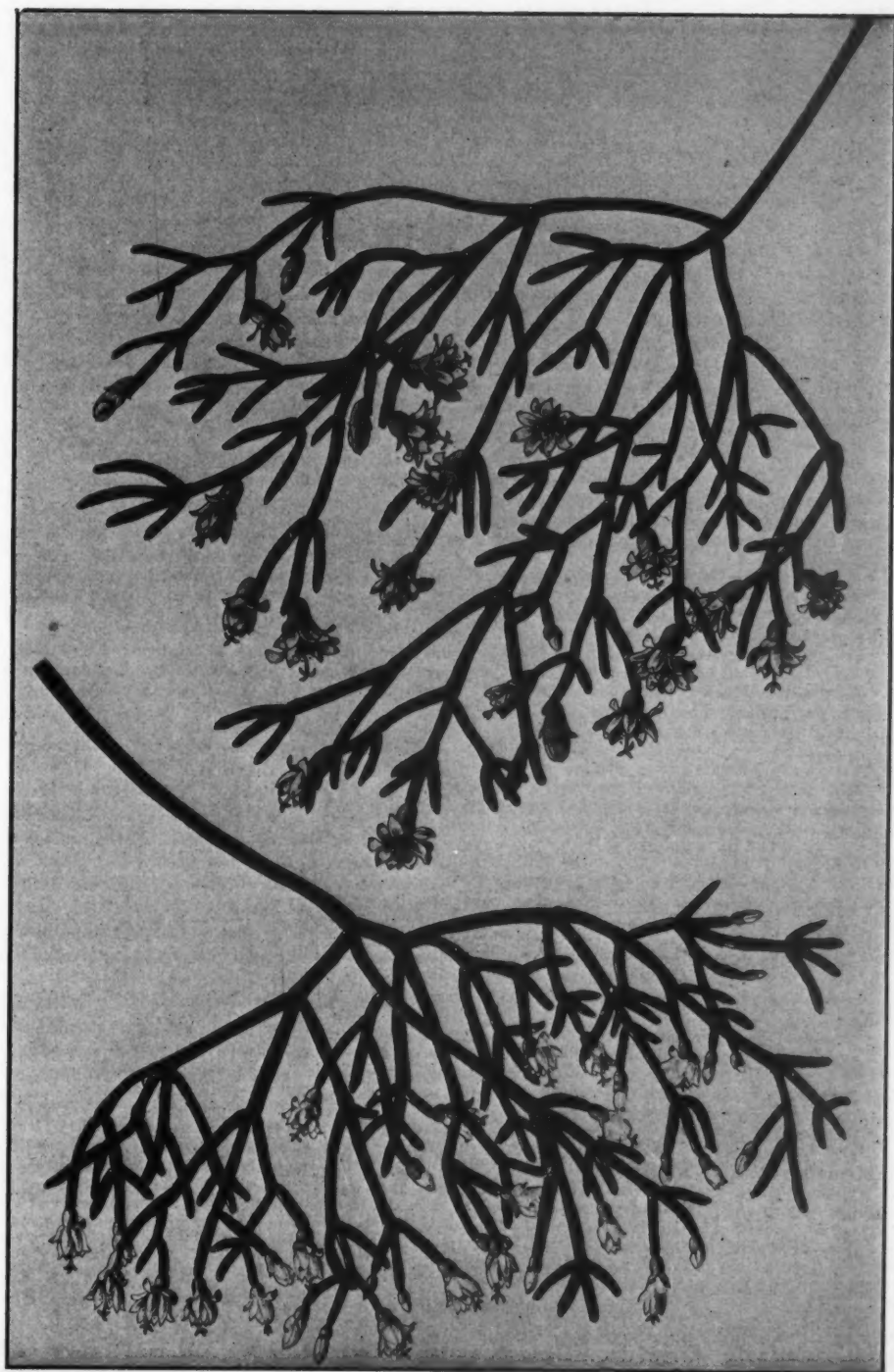
### CLASSIFICATION—1950

Notes by W. TAYLOR MARSHALL

*Rhipsalis cribrata* (Lemaire) Rumpler.

*R. penduliflora* N. E. Br. is considered as a mere variation of *cribrata*.





*Rhipsalis cribrata* Lem. and *Rhipsalis penduliflora* N. E. Br.

Plate 27

From Blühende Kakteen—July 31, 1902.

*Echinocactus coptonogonus* Lem.

Plate 28

*Echinocactus coptonogonus* Lem., Cact. gen. nov. et spec., 87; K. Sch., Gesamtbeschr., 362.

We have followed the general policy in placing this species with the thin-ribbed *Echinocacti* of the sub-genus *Stenocactus*, which formerly included the Series *Stenogoni*; here it is properly placed even though it must be granted a distinct position. In the form and color of its flowers it resembles the other species of the sub-genus; it also resembles them in its juvenile form, differing from the usual rib-forming species in that the seedling, with its separated tubercles, resembles a young *Mamillaria* rather than a true *Echinocactus*. But in having fewer and more robust ribs it differs from the majority of its type.

*E. coptonogonus* Lem. has been in cultivation for more than 60 years and today can still be found in the larger collections. Yet recently we have seldom received it from Mexico, and in any case one no longer sees those large and beautifully-spined specimens which were to be had at one time. In support of this statement are the truly gigantic dried specimens which we preserved in the Royal Botanical Museum. On these, the powerful, curved, deeply annulate central spines have a length of over 8 cm.

Here I will take the opportunity to say a few words concerning the species of *Stenocactus*. As to the validity of the species there are at present two opinions: The first, originally offered by A. Weber and more recently supported by Vaupel (Monatsschr. f. Kakteenk. XII, 75), is that all the species so far named should be considered as a single species, for they are related to one another through transitional forms. The other view, which I have advocated in the Gesamtbeschreibung, holds that some of the species should be maintained for the present, although it must be admitted—as it also was in the Gesamtbeschreibung—that the majority of the described "species" differ but slightly from one another. Yet I believe it must also be admitted, and by the adherents of the first-mentioned theory as well, that the validity of the species pictured on the accompanying plate cannot be questioned. By no means do I wish to deny having doubts as to the value of some of the species I earlier recognized. Today I am doubtful whether *Echinocactus phyllacanthus* Mart., *E. pentacanthus* Lem., *E. obvallatus* P. DC., and *E. crispatus* P. DC., should be maintained as separate species. The late Mathsson informed me that at the type locality of the very distinct *E. multicostatus* he had observed gradual transitions that showed a much lesser number of ribs on which the short spines gradually lengthened, eventually producing plants of quite a different appearance. We well know that later on the former generally no longer came to us, and that the long-spined forms alone were available for some time, till they too were met with no longer.

Thus I am in no way inclined to ignore the observations of those who advocate the merging of distinct forms of the sub-genus *Stenocactus*, but on the other hand I cannot refrain from warning them not to "throw the child out with the bath-water," as the saying goes. Many species of *Stenocactus* have been grown by us in Berlin and are still being cultivated today; Herr Hirscht, Chief City Clerk, has especially earned much credit in that for several years he paid particular attention to these forms and raised as many species from seed as possible. I myself pursued the same efforts during that time.

The course of development in the seedlings is a very important factor in solving the question of nomenclature; both of us came to the conclusion that various differences occur in them. While one will develop as a dwarfed, compressed form, another will soon grow upwards into a column; even if one is of the opinion that the number of ribs and the spination are of but slight importance in this case, one must still admit, after only a few observations, that fixed characteristics obviously exist in the seed.

Moreover, the following circumstance is to be considered: I certainly do not doubt the claim for variability, for example in the neighborhood of Pachuca. But whence did these come? Here it must be very carefully proven that these transitional forms have not arisen from hybridization between the more distinct species, a point worth considering due to the tendency of cacti to interbreed. If one then says, after a quick study: all species of the sub-genus *Stenocactus* should be considered as one—then does one assume all species to occur in Pachuca, or wherever else the observation has been made? Then are all species well-known to the holder of this opinion? Has he seen the yellow- and white-blooming species and those with relatively few ribs? One would therefore be deluding himself in thinking that such a superficial method would show very impressive results! These same forms, then, which today are separated as species must eventually be re-established as varieties in the immense confines of a species. Then we shall separate the natural forms and name those that seem distinct; whether the name we choose for each form be species or variety is immaterial.

## CLASSIFICATION—1950

Notes by W. TAYLOR MARSHALL

*Echinofossulocactus coptonogonus* (Lem.) Lawrence

Schumann's remarks on the similarity of many of the species in this genus is worthy of careful reading. Of 108 named specimens, which I received from Mexico about eight years ago, only 15 are worthy of specific rank.

## PERMANENT PLANT RECORDS

By LYMAN BENSON

**The need for a permanent record.** Fifteen years ago, a member of the California Legislature began one of his numerous public speeches as follows: "First I must tell you exactly what I am going to talk about, because it may not be possible to tell just from listening." It is necessary for every author of plant genera, species, or varieties to preserve a record of what he has described, since it may not be possible to tell just from reading.

If living plants had been created according to a simple, clear-cut, prearranged plan, as have postage stamps and coins, possibly there would be relatively little confusion concerning the meaning of an individual author. However, the plants of today have arisen by gradual, irregular evolution over a period of at least five hundred million years, and they are not divisible into distinct classification units like those into which stamps and coins may be sorted. Plant species vary as do the races of dogs or of men, and there are the same complexities of interrelationship within and among them. Classifying living plants is not simply a matter of looking for individuals slightly different from their fellows and of applying new names. Instead, it is an exceedingly complicated process of balancing differences against similarities to determine whether the similarities are sufficient to bring the plants into the same group or whether the differences are great enough to place them in different groups. The inherent complexity of the problem makes the matching of a written description with a living organism very difficult. Just as no two human beings are exactly alike, no two plants are identical either. Consequently, it is necessary to preserve a specimen of the plant as a permanent record of the exact meaning of the author so that later workers may determine which other plants approach it most closely or essentially match it.

**Preparation of the record.** At first thought, a specimen growing in a garden would seem the best record of what is being described. However, gardens are ephemeral—things happen to them. Southern California cactus growers remember all too clearly the winter of 1948-49 when extreme low temperatures undid the work of many years. Extremes of climate, insect or fungus pests, neglect, and many other factors contribute to the ruin of gardens. If some en-

vironmental factor or combination of factors within the garden does not kill the specimen eventually, probably human characteristics will in the course of time. A university in the cactus capital has had at least three outstanding desert succulent gardens during its sixty-year history. The first of these lost out to an administrator whose ideas of beauty in nature were restricted to forests, meadows, and babbling brooks. The last suffered slow strangulation after loss of the president who sponsored it and the men who built it, since the preference of succeeding administrators was for a formal sunken garden. Gardens are vulnerable to the forces of nature, to the inroads of biological competitors and parasites, and to the great diversity of what human beings appreciate and enjoy. The only sure thing about them is that someday they will suffer quick decline.

Herbaria (collections of dried specimens) are far better actuarial risks than gardens. If a specimen is prepared well and kept thoroughly dry, it will last for an indefinite period. The oldest plant collection in existence today is the herbarium of Caesalpino, which has been preserved in Florence, Italy, since approximately 1583. The two-hundred-year-old herbarium of the great Swedish botanist, Linnaeus, is preserved in London, where it was deposited many years ago. On two occasions it has been underground to secure safety from bombing. Nonetheless, this collection still exists as an all but indelible record of the meaning of the many descriptions in Linnaeus' "Species Plantarum" and "Genera Plantarum."

Even in time of peace an herbarium is subject to some danger, though to much less than a garden. Danger from climatic factors is at a minimum; danger from insects and fungi is less, but real, unless precautions are taken to provide insect repellants and insecticides and to keep the specimens dry; danger from changes in administrative policy are great, though much less devastating than with gardens. Many a plant collection has been allowed to go stagnant or sometimes to disintegrate because of a temporary change in policy. However, in most cases the really valuable collections have been salvaged because they are able to endure through considerable periods of neglect—periods which would eliminate a garden. In addition to the usual hazards, an herbarium is subject to an-

other one—fire. Fortunately, the major herbaria and most of the minor ones are housed in essentially fire-proof buildings, but this is not true for all collections.

The chief limiting factor in herbarium specimens is not their preservation but their preparation. In most cases a specimen is as good as it was made in the first place. After plants are dried out thoroughly there is usually little further change, although a few plants, such as the California poppy, lose their flower color in the course of several years. When the average plant is pressed, if the job is done well, the original coloring of both vegetative and floral parts is likely to be preserved or at least to follow a standard pattern of change. The plastid pigments, like the green (chlorophyll) of most plants or the many special colorings of flowers or other parts, are altered little by proper drying. These pigments are insoluble in water and are fixed in solid bodies (plastids) within the living cells where extraction of water from the cell sap does not ordinarily affect their color. On the other hand, dissolved pigments, such as the anthocyanins responsible for most coloring in the magenta series (ranging from lavender to purple) are altered by removal of the water or change of the pH (alkalinity or acidity) of the cell. Many of these pigments behave as does litmus paper, changing from red in an acid medium to blue in a basic (alkaline) medium. In the preparation of specimens anthocyan pigments change usually to a nondescript blue regardless of pressing methods.

*Pressing specimens.* Ideally, an ordinary plant specimen should be dried out within two to four days. An effective method of drying is with a plant press and the associated equipment and material listed below.

1. The press itself is constructed in any of many ways, and it may range from two pieces of 1" x 12" lumber to a cabinet maker's dream. Ordinarily, the size of the two sections of the press should range from standard herbarium mounting sheet size (16½ inches by 11½ inches) to 18 x 12 inches. The simplest and cheapest kind of press, and yet one which is effective, consists of two sheets of half-inch plywood. These and the enclosed materials are tied together into a neat bundle either by straps or ropes. The preference of the writer is for window sash cord, since it may be tied or untied quickly. A six or seven foot length of sash cord is used at each end of the press. A loop or bowline knot (consult any—almost any—Boy Scout about this) is tied in one end of each cord. The cord is fastened to the outside (bottom) of the lower half of the press by long tacks or

staples, and the knot is left protruding slightly beyond the edge. When the press and its contents are put together, it is a simple matter to cinch up the cords on both ends. Proper pressure upon the plant specimens is secured by kneeling on top of the press.

2. Dryers (cardboards and blotters) are cut to the dimensions of the press, as, for example, 18 x 12 inches. The cardboard should be of the corrugated type used for many cardboard cartons, but the corrugations should be large since they are necessary for passage of air current through the press. Probably the cheapest and best kind of blotter is cut from the rolls of deadening felt used in the walls of houses. This felt may be obtained at a hardware store. As plants are pressed, cardboards and blotters are used alternately, or for thick specimens like the cacti extra blotters may be necessary.

3. Old newspapers serve to enclose the specimens. These should be torn to make folders the size of a standard newspaper page, that is, approximately the size of the press. The usual order of arrangement for driers and specimens in the press is as follows: cardboard, specimen in a newspaper folder, blotter, specimen in a newspaper folder, cardboard, etc. The cardboards and blotters alternate and the specimens in newspaper folders fill in the spaces between them. Each specimen in newspaper, then, has a blotter on one side as an absorbent layer and a cardboard on the other side as a layer presenting a smooth, flat surface and making aération possible through its corrugations.

After the specimens in the press are ready for drying, it is necessary to facilitate the removal of water. The most effective method, at least in the western United States where humidity is not high, is to place the press in a cabinet through which an air current is drawn by an electric fan. The same results may be achieved by simply placing the press in front of a fan in such a way that the air current passes through the corrugations of the cardboard. A cabinet in which heat may be applied to the specimen, particularly if the heat is associated with some air movement, is effective also. Within limits, the same results may be achieved by placing the press out-of-doors where the prevailing winds will blow through the corrugations and the sun will warm the press. However, with this method it is necessary to change the driers every day or to dry them in the sun for brief periods. Placing the press on a steam radiator is a fairly good method of drying, but heat must be applied with caution, since if the specimens are too hot they will become brittle and perhaps



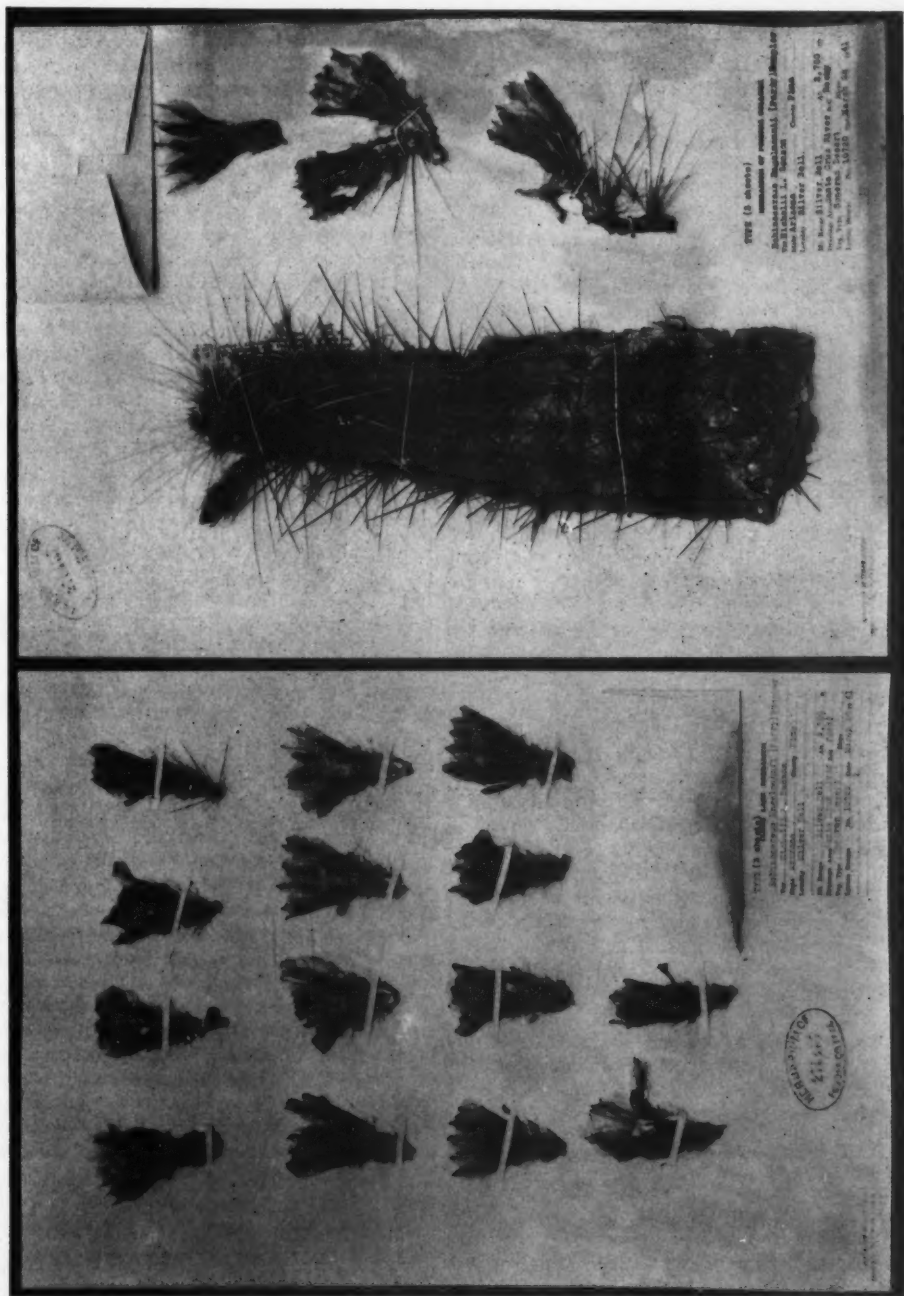


FIG. 44. Two of the three herbarium specimen sheets of the type specimen of a cactus, illustrating methods of mounting on cardboard (all-rag paper sheets,  $16\frac{1}{2}'' \times 11\frac{1}{2}''$ ). This paper endures indefinitely. The specimens are fastened by gluing, by use of gummed linen strips, or by sewing with coarse linen thread or by a combination of these. The labels are written with either a typewriter or with a carbon-suspension ink (India or eternal), since ordinary ink fades out after a century or so. The rag-paper fragment folders contain additional portions of the plant. The herbarium accession number, 275,437 is not duplicated, and it serves as a precise means of reference in the botanical literature.

turn brown. In the tropics and other areas where the humidity is high, special methods must be used for drying plants.

*Succulent specimens.* The drying of succulent plants is a special process. Various methods are used by individual collectors. Some of the best have been described in a well-worked-out and beautifully illustrated article by Mr. Robert H. Peebles, Director of the United States Field Station at Sacaton, Arizona, (Cactus and Succulent Journal 14: 3-8. f. 1-11. 1942). Dr. Ira L. Wiggins, Director of the Dudley Herbarium at Stanford University, has prepared another article for the Journal on this subject. It appears on page 72 of this same volume. The writer (Torreya 39: 73-75. 1939) has provided additional tips concerning pressing specimens and particularly preparation of succulent materials.

Preparation of a specimen for an ordinary herbarium sheet or a series of them is more desirable than preparation for a box or jar, since the plant may be filed with the others of its kind and it is not so likely to end up on an obscure shelf apart from the rest of the collection or in the basement behind a pile of lumber. The less bulky cacti may be prepared as herbarium specimens by being split with a knife and fork and then hollowed out like a dugout canoe. If the cut surfaces are covered very heavily with salt and the material is allowed to stand for several hours or perhaps overnight, large quantities of water may be poured or wiped off and so eliminated before pressing. Just as the specimen starts to curl it should be placed in the press and dried in the ordinary manner save for the addition of extra blotters and the changing of these each day. Flowers should be split lengthwise but not hollowed out. Like the rest of the specimen, they should be coated heavily with salt. If the salt is in a position where it will show on the herbarium sheet, it may be removed from the dried specimen by brushing or by washing with water; the washing should be followed by a short redrying process. Not only does the salt aid in removal of water from the specimen, but also it discourages the growth of molds.

Some cacti, or parts of them, cannot be dried by the usual method of pressing. Large segments, as, for example, several ribs from the stem of a barrel cactus, may be salted and then dried in the open air for preservation in boxes or they may be preserved in jars by use of 5-10% formaldehyde or various formalin-alcohol solutions. Specimens in boxes may be destroyed by fire or other catastrophies, but their prospects for 1,000 years preservation are probably somewhat better than for plants in jars. Jars often lose their fluid, and their contents become a

sorry mess unless they have permanent and vigilant care. They may be broken by earthquakes or bombings. Specimens in boxes may be examined for detail more readily than may those in jars. The uses for the specimen, which may include sectioning, are the final determining factors in a choice between boxes and jars. Which is to be chosen depends, too, upon the facilities of the institution for storage and care of particular types of specimens.

Preparation of many other succulent plants is simpler than for the cacti. Specimens of *Echeveria* may be pressed effectively by the usual methods, provided the epidermis of the thick portions of the stems and leaves is slashed and then salted very heavily. This can be done most effectively by turning the slashed side of the specimen downward so that it rests on a layer of salt. The salt kills the plant and absorbs most of its water. Usually it is necessary to change the driers each day, although it may be necessary only to check them if a current of warm air passes through the corrugations of the cardboards. Usually a few extra blotters are necessary. If a specimen is particularly bulky it should be split lengthwise from the base upward to form two specimens, or split a little off-center so that only one specimen is formed. In this case the cut surfaces should be salted heavily.

*Selection of material for specimens.* The material selected to make a specimen should include all the important parts of the plant. In an ordinary annual herb this includes the whole plant, and particular care should be taken to secure the roots, since the root system is important in plant classification and since often there are other special underground features such as tubers or rhizomes. Almost inevitably, a specimen which does not include roots lacks, also, the basal leaves (those at ground level), which differ commonly from those higher up on the stem. This or any other type of plant should include both flowers and fruits, since these are of prime importance in classification. Few would attempt to press a pine tree, but its essential characters may be represented by both its seed-producing and pollen-producing cones, its leaves, and its bark. A typical woody flowering plant, such as an oak tree, should have its specimens collected to include branches with representatives of all types of leaves, together with acorns (in the fall) or both kinds of flowers (in the spring) and with bark representative of the distinctive pattern for the species.

A specimen of a succulent, such as an *Agave*, should include at least one of the largest leaves embracing everything from the broad base to the spine at the tip, even though this may require

several herbarium sheets or several sections mounted side by side on the same sheet. There should be, if possible, both flowers and fruits and representative sections of the flowering stem. The smaller species of *Agave* may be split lengthwise so that the specimen includes part of the basal leaf rosette as well as the reproductive parts. Specimens of small cacti should include all or half of each plant, while specimens of larger cacti should include representative portions of the stem. For example, several joints of a prickly pear or a cholla are necessary, and these should be of various ages. For a large cactus a stem section showing several ribs is necessary. This should exhibit all types of spines, taking into account the variability at different levels on the plant. If possible, the angles of the spines should be preserved. When it is practical the root system of the plant should

be shown also. The flowers and fruits, as always, are of great importance.

To be worthy of scientific consideration, a new genus, species, or variety must be based upon extensive studies of the natural population represented by specimens. A new "species," for example, is worthy of description only when it represents a well-defined population of evidentially genetically related individuals. A single individual differing from the others nearby does not ordinarily constitute such a natural population, and it is not worthy of naming as a species or variety. In order to define a somewhat segregated natural population as many specimens as possible should be available, and these should be accompanied by full data concerning the location and the situation in which they grow. This gives a research worker clues to follow up in the field as he examines the

## ARIZONA 1949

October 16

Western base of Echo Cliffs, 18 miles south of Navajo Bridge, Coconino County. 5,200 ft. Colorado River Drainage Area. Red sandstone and perhaps limestone. Mixture of desert vegetation types.

14242 *Opuntia*

14243 *Mammillaria*

Same data as above:

5 miles south of Navajo Bridge. 5,000 ft. Oct. 16

14244 *Chrysothamnus*

14245 *Eriogonum*

14246 *Atriplex*

14247 *Opuntia*

Same data as above:

East end of Navajo

## ARIZONA 1949

○ Bridge, Oct. 16, Estimate 4,500 feet.

14248 *Opuntia*

14249 *Opuntia*

14250 *Opuntia*

North end of Kaibab Plateau on Road from Jacob Lake (Coconino County) to Fredonia. 7,000 feet.

Colorado River Drainage.

○ Rocky soil. Juniper-Pinyon Woodland. Oct. 17

14251 *Juniperus*

14252 *Artemisia*

Same data as above:

Sagebrush Desert.

6,200 ft. Oct. 17

○ 14253 *Opuntia*

14254 *Mammillaria*

14255 *Opuntia*

FIG. 45. Two sample pages from a field book. The specimens are numbered serially. The data are those required by the specimen label, although any points which the collector can add readily from a map may be omitted.

plants of many hillsides and valleys to determine whether a segregated natural population actually exists or whether, instead, individuals on the herbarium sheets represent only one association of genes in a highly variable population just as human beings with red curly hair and blue eyes represent only one genetic combination among the many of the human species. Lack of data makes the plants in most cactus and succulent gardens of very little scientific value, since there is no way to determine the exact place and definition in nature of the population from which they were collected at random.

**Recording data.** What data should be recorded depends largely upon intended use for the specimen. An herbarium may fulfill any of several functions. It may be no more than the hobby of an individual, a reference collection for checking the identity of plants, or a selection of material for use in teaching or it may be a research collection. The type of label varies according to intended use. For his own immediate purposes an amateur botanist making collections of local plants may need no more than the name of a familiar town, hill, lake, or ditch. A reference collection for use of forest rangers may require special information useful in forestry and range management. A collection designed for teaching and student reference may differ in its data requirements from one intended primarily for research. However, since many small collections prepared for limited use ultimately become parts of large herbaria, it is advisable to use labels which will cover the principal points necessary for most scientific purposes. To be of value for research, each specimen should include the data required by the label printed on page 64 of the Journal for March of this year and reproduced below, or at least it should include enough data that missing points may be figured out from a map. This label was constructed after collecting numerous specimens in the field and using these and many others in research.

#### HERBARIUM OF POMONA COLLEGE

Var.....  
 State.....County.....  
 Locality.....  
 Mt. Range.....Alt.....ft.  
 Drainage Area.....Soil.....  
 Veg. Type.....  
 Slope.....Date.....19....  
 Collector.....No.....

The top blank line of the label is intended for the name of the plant, that is, the genus and species. This should be followed by the abbreviation of the author's name as it is found in

technical books. Authors' names are not placed after plant names in order to honor anyone, but rather to serve as a tool for reference. A single name may have been applied to two or more plants by different authors, but by placing the author's name after the plant name the application is limited to one usage which may then be found in the literature.\* Having the genus, species, and author's name (e.g. *Cercidium floridum* Benth.), one may go to the Index Kewensis or the Gray Herbarium Card Index to find the rest of the reference to the original place of publication. By consulting this publication, he may find whatever information is available concerning the specimen upon which the original description was based; finding the specimen, he may see exactly what was being described. By going to the place of collection of the specimen, he may study the population from which the original plants were taken. By comparing these with each other and with their neighbors, he may determine whether or not they constitute a separate natural population worthy of a name. When two authors' names or abbreviations are given, the first in parenthesis and the second not, there are two references, e.g. *Prosopis juliflora* (Swartz) DC. The name in parenthesis refers to the original description of the plants upon which the species was based. The author's name following the parenthesis refers to publication of the recognized combination of names. In this instance, the species epithet (*juliflora*) was not published in combination with *Prosopis*, but under another genus, as *Mimosa juliflora* Swartz. Consequently, there are two authors to be considered, one (Swartz) supplied the species epithet (*juliflora*) and the other (De Candolle abbreviated to DC.) having supplied the classification of the species with respect to a genus (*Prosopis* instead of *Mimosa*). Similar use of authors' names may indicate the transfer of a variety from one species to another or of a species to varietal status or vice versa. Although for reference or teaching purposes inclusion of the author's name has no importance, it is necessary for precision in research. Omission of these names from specimen labels is one of the many little tell-tale signs of an amateur job as opposed to professional work.

The second line of the label, beginning with

\*In part author references are necessary because inadvertently two authors may use exactly duplicating combinations of generic and specific names for different plants, as, for example, *Ranunculus tenuellus* Viv. and *Ranunculus tenuellus* Nutt. Although only one of these names (the earlier one) is valid, both may appear in the literature of botany for a time until the duplication is discovered. Consequently, it is important to cite the author reference to avoid confusion.



"Var." (the abbreviation of *varietas* or "variety") is intended for the varietal epithet, if any, and its author references.

The next three items deal with location of the point at which the specimen was collected. The locality should be specific, and it should be associated with some permanent geographic feature. A crossroads post office may be a ghost office in forty years; a well-established farming community is likely to persist. Usually, but not always, the name of a valley or mountain is permanent. Judgment must be used in any statement of locality. Usually a statement should be made in terms of mileage in a particular direction from the nearest clearly permanent and readily located point of reference.

Mountain ranges serve both as a definite location and as important research data, since the flora of one mountain range often differs from that of another. Knowing the mountain range inhabited by a plant may contribute to recognition of endemic populations characteristic of only one or a few ranges or it may be helpful in working out the general area inhabited by a more widely distributed population.

In many instances it is important to know whether a specimen was collected on one side of a mountain range or the other. For example, at Snoqualmie Falls on the western slope of the Cascade Mountains in Washington the average rainfall is about eight and one-half feet, but on the eastern side of the same mountain range at a similar elevation in the vicinity of Wenatchee the average is about ten inches. Consequently there is a profound difference in the associations of vegetation on the two sides of the range. These differences are emphasized in the item called "Drainage Area." Snoqualmie Falls is in the coastal forested drainage area of Puget Sound, whereas Wenatchee is in the inland semidesert drainage area of the Columbia River. Statements of drainage areas should be in terms designating areas of differing vegetation, e.g. Great Basin, Great Plains, Colorado River, Missouri River, San Joaquin Valley, Pacific Slope, Mojave Desert, Atlantic Coastal Plain.

The vegetation zonation according to altitude in the mountains is equally important. Only ten airline miles from the orange groves at Claremont is a mountain summit of 10,000 feet elevation. In this local 9,000-feet differentiation of altitude are three well-marked vegetation zones, each harboring many species entirely different from those in the others. On a winter or spring day at Claremont the temperature may be seventy or eighty degrees while at the summit of the mountain there are five or six feet of snow. Study of particular species involves their correlation with altitudes as well as with locali-

ties and general ranges of occurrence.

Recording the data in the space marked "Soil" depends largely upon the individual and his background. A soil chemist may designate a particular soil as "Aiken clay loam;" another person may describe the same soil as red clay; another may call it "red" or "fine" soil. It is important to record as much as one can, and particularly to indicate derivation of soil from some recognizable special kind of rock, for example, limestone or serpentine, since many plants are very "choosy" about soil types although others are not. In some instances this item or some of the others must be left blank because of lack of information.

The recorded data concerning vegetation types depends also upon the background of the individual. Some may use the word "brush," others "chaparral." The more specific the designation for any vegetation type the better, but there will be inevitable variations according to differing systems of vegetation classification. Even if no system is known, a description in ordinary terms is helpful. For many who have no special knowledge of plant geography, such a description as "brush," "among oak trees," "yellow pine forest," "redwood forest," "hardwood forest," "deciduous forest," "prairie," "piney woods," or "hammock" may tell the professional botanist part of what he needs to know.

In botany there are only two slopes, north-facing and south-facing, simplified to "north" and "south." The difference in the vegetation of the two sides of the same hill may be equal to that produced by a variation of one to three thousand feet of altitude, for the south side of the hill is exposed to the sun, while the north is not. On the north the temperature is lower, and more moisture is retained.

The last item in the list is a "specimen" or "field" number. Many systems are possible, but one is adopted almost universally in North America, and there are technical reasons for using it rather than a more original one. In particular it is understood by all botanists. This system consists of giving each plant a number as it is collected in the field and keeping a record of the number and the data concerning the habitat in a notebook or "field book." The plants are numbered consecutively, beginning with 1. The other data need be entered in the field book only once for each locality on a given date, with the names and numbers of the plants collected there listed under the data. If several duplicates of a specimen are collected each is given the same number. The use of a field book eliminates the necessity of putting more than the field number on the newspaper sheet holding

each plant. In the botanical literature this number serves another important purpose, for it facilitates reference to the collections of an individual. Since the number is a part of a series and is not duplicated, a reference to *Smith 7451* is precise, though it may refer to any one of a set of duplicates. In the literature, addition of a symbol to the field number indicates the exact herbarium in which the specimen has been examined. Use of several symbols indicates that duplicate specimens occur in different herbaria.

As stated above, in some instances certain items called for in the labels may be omitted, and good specimens already collected should not be thrown in the junk heap for lack of full data if they include certain essentials. For example, botanists who have travelled in the area from which a specimen came may be able to fill in much of the information required even though the label carries no more data than "Steamboat Springs, Colorado" or "Asheville, North Carolina."

**Use of the records.** Under the universally accepted International Rules of Botanical Nomenclature, whenever a new species or variety is described a "type" specimen must be designated and must be preserved in a permanent collection to show what was described. Since 1935 no newly described species or variety receives recognition in botany if a type is not so designated. Such a name is considered a *nomen nudum* or bare name and is officially unpublished. It has no status insofar as priority is concerned, and names published later supercede it. Its author may as well have written nothing, and his reputation is worse than if this were true. All his work is likely to be examined critically to determine the adequacy of his comprehension of problems in botanical classification and the means of presentation of data and conclusions. He will have two strikes on him, and he will have to hit the third pitch.

The connection of type specimens with present day botanical literature is a precise one. The published description of each species or other entity includes a reference to the name and field number of the collector of the type and usually references to the collectors of other specimens. Stamped on the herbarium sheet, also, is a serial number for the herbarium as a whole. Thus the type specimen sheet may be designated not only by collector and field number but also by an herbarium sheet number (e.g. in Figure 44 *Pomona College Herbarium 275,437*). This eliminates any possibility of confusion.

The herbarium is much more than a depository for type specimens; it is the basis for the complicated literature of systematic botany. The Southern California Section of the Herbarium of Pomona College is Dr. P. A. Munz's "Manual of Southern California Botany" preserved in herbarium form. Any qualified person may determine there exactly what Dr. Munz had in mind with respect to nearly any species appearing in the Manual. On the same floor are approximately one hundred thousand specimens from the collection of the late Marcus E. Jones and a like number from the collection of the late Professor C. F. Baker. From these collections may be determined the exact meaning and basis of the writings of both these men as well as many others. For example, Jones' monograph of the genus *Astragalus*—a complex group which includes the loco weeds—is documented by specimens in one set of herbarium cases. The function of any large herbarium is to preserve records of the material upon which botanical literature has been based and to provide a body of raw data to form the basis for further studies, so that old records and judgments may be correlated with new.

Department of Botany, Pomona College  
Claremont, California.

## NOTES ON HAWORTHIAS

By J. R. BROWN

**Haworthia planifolia** forma *alta* Triebner & Poelln. in Repert. Sp. Nov. XLV (1938) 162.

Plant shortly caulescent and proliferous from the base; the stem 2-2.5 cm. long.

Leaves; the size of the rosette and the shape of the leaves are about the same as in var. *typica*, but the color is a grayish-green, the upper half of the leaves somewhat brownish-red and with darker margins and a short point at tip; the margins and keel smooth.

Type locality: Cape Province: Grahamstown.

This *Haworthia* is distinct from other forms of *Haw. planifolia* Haw. by its stem forming habit; this gives to a cluster a much looser appearance by reason of the offshoots being farther apart from the parent plant, the offshoots developing a stem while quite young. The brownish coloring of the leaves may disappear after so long a time in cultivation and the margins may become more or less pellucid; the leaves may also show some minute teeth on the lower margins.

Some notes on the flowers are given here.

Peduncle simple, slender, 20 cm. or more in length, including the raceme, 1.5-2 mm. diam., pale brownish-green, shining, terete, somewhat angled and glaucous in raceme part; sterile bracts many (ca. 10) more numerous towards base of peduncle, 10-7 mm. long, white, membranous, with a pale green or a pale brown keel, ovate-deltoid, long acuminate; pedicels 3-4 mm. long, shorter upwards; bracts about the same as the upper sterile bracts; perianth 14-15 mm. long, tube obclavate, somewhat triangularly

rounded, about 3.5 mm. in diam. at base, white with pale greenish lines; segments obtuse, recurved, spreading, white tinged pink, lower segment very recurved, the 2 lateral segments with elevated margins and with green lines, the others with brownish-green lines; face of flower ca. 8 mm. diameter.

The plant shown in the illustration was received from the Botanic Garden, Dahlem, Germany.



FIG. 46. *Haworthia planifolia* forma *alta* Triebner and Poelln. nat. size.



FIG. 47. *Sedum lenophylloides* Rose.

## SEDUM LENOPHYLLOIDES

By LADISLAUS CUTAK

Missouri Botanical Garden

Chipinque Mesa overlooks Monterrey, largest industrial city in northern Mexico. A visit to Chiquinque and what was found there serves the basis for this story. However, before getting to the main part of the report, permit me to mention a thing or two about Monterrey. This very much Americanized town nestles in a broad valley through which the Rio Santa Catarina flows, coming in through the picturesque Huasteca Canyon, home of the aristocratic Queen Victoria Century Plant.

I first visited Monterrey in 1939 as guest of Dr. and Mrs. H. A. Geitz. During that first visit I had the opportunity to see many of the interesting local places, as well as most of the cactus regions in Nuevo Leon and Coahuila. For an account of this trip I refer you to the April, 1940, CACTUS JOURNAL and my story, "Beyond the Beaten Path."

Chipinque Mesa was one of the few places I had to miss because time was running out on me. Picturesque Chipinque is a favorite spot for the Geitzes, who are wont to go there on Sundays for their dinners during the hot summer months,

as the breezes are always cool at that altitude.

In April, 1947, I stopped off in Monterrey for a short rest before returning to the United States. I had been tramping through southern and central Mexico for several weeks, collecting plants for the Garden's collection. The accommodating Geitzes drove me to Chipinque Mesa for a Sunday dinner and a tramp among the fragrant pines.

Tiny bulbous plants with grass-like foliage and white, star-shaped blossoms appeared among the rocks. A number of flowering herbs were tinting the slopes, while everything else was lushly green. Scampering among some huge rocks I was drawn to a large weather-beaten boulder upon whose face, in cracks, grew small clumps of a soft-leaved maguay. In association with the Agave I noticed a jumble of wiry stems covered with closely set turgid leaves of dark green to purplish hue. Immediately I recognized it as a Crassulaceous plant but couldn't place it in any genus.

A few short stems, as well as a pinch of leaves, were placed in a small cellophane en-





FIG. 48. Habitat of *Sedum lenophylloides*, overlooking the valley in which lies the city of Monterrey, Mexico. Elevation approx. 5000 ft. White arrow points to mass of this stonecrop.

velope and carried home by plane a few days later. Arriving at the Garden the material was placed in sand and from this a few plants were propagated. The identity of the plant still puz-

zled me, but I began to think it might be a *Lenophyllum*, although that genus is known for having its leaves in opposite arrangement whereas our plant had them in alternate fashion. Then, one day last October, the plant threw up an inflorescence and immediately I recognized it as a *Sedum*, but which one? Careful study revealed it to be *Sedum lenophylloides* Rose.

*Sedum lenophylloides* does not appear to be in cultivation anywhere. No mention of it has ever been made in the JOURNAL or other popular garden magazines and as far as I know no illustration of it has been published, with the exception of a line drawing in Fröderstrom's systematic essay on the Genus SEDUM. From this I gather the species is not too well known and therefore bring it to the attention of our readers.\*

It may not be one of the most desirable stonecrops on account of its sprawling habit but to me it looks like a promising subject suitable for a hanging basket. It is easily propagated from stem cuttings, as well as from leaves which drop off when disturbed. This stonecrop was first collected by C. G. Pringle in the mountains of Monterrey in 1903 and grown in Washington for four years before flowers were produced. Pringle again collected it in 1907 and it is upon this collection that the type was founded by Dr. J. N. Rose.

*Sedum lenophylloides* is a much branched perennial stonecrop, its stems at first erect but

\*Since this was written Dr. Clausen published a picture and comparative notes on this *Sedum* in the May-June, 1950, Cactus Journal.

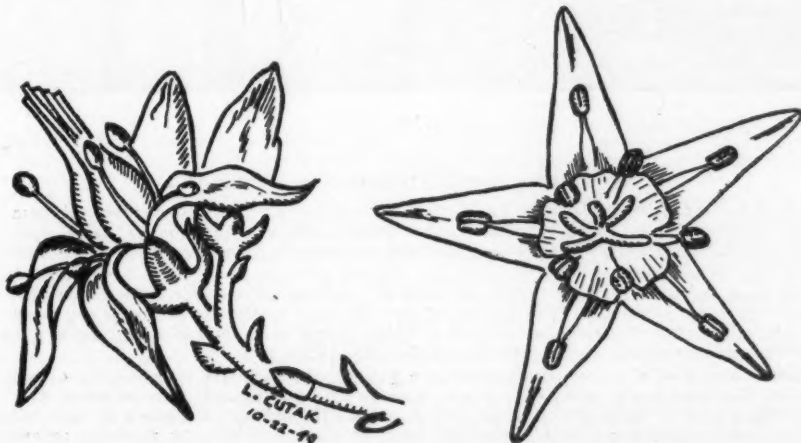


FIG. 49. *Sedum lenophylloides* showing side and face view of flower. x 5.

later becoming a tangled mass. The smooth stems become woody at the base and may attain a length of twelve inches or more. Closely set, very turgid, spreading leaves usually appear in alternate fashion, although the lower ones may be opposite. The leaves are for the most part oblongish, acute at the tip, rounded on the underside, somewhat flattish or even trough-shaped above, of a grayish green (Andover Green: Ridgeway) color but often pronouncedly dull purplish on the face, slightly paler underneath, up to five-eighths of an inch long and three-eighths inch broad. The point of attach-

ment is very small and consequently the leaves drop off readily on the slightest contact. Inflorescence is a short terminal panicle composed of few to many flowers. Individual flowers are rather inconspicuous with small green ovate sepals and lanceolate to oblong, obtuse, greenish white petals which are free to near their base. There are ten stamens, about three-eighths inch long, five of them being distinct while the other five are attached to the petals (epipetalous). Nectar scales are large, orange colored. The carpels are erect at first but later more or less spreading, and long-styled.



FIG. 50

#### HAS FOURTEEN YEAR OLD LOBSTER CLAW CACTUS

A large number of house plants are lost through lack of interest. But this cannot be said about the Lobster Claw Cactus owned by Mrs. Norman Bennett, Hollis, Hillsborough County, New Hampshire. This immense plant is fourteen years old, and when in bloom boasts of between four and five hundred blossoms.

This plant and a Christmas Cactus of the same size and age are the only house plants Mrs. Bennett owns. She doesn't give them any special care, but does recommend putting leftover cold coffee around the roots. She says this acts as a fertilizer. Before trying the coffee, her plants were skimpy and undernourished. Since its use she says they have picked up.

Quite a number of slips from these plants have found homes with Mrs. Bennett's friends and neighbors. She recommends cutting off a fairly large slip with approximately three branches. This is placed in a glass of water to root before potting in soil. Through past experience she says this type of cactus should blossom the following year with the number of blossoms depending on the size of the slip.

Photo by CHARLES L. STRATTON.



# SPINE CHATS

LADISLAUS CUTAK



*Epiphyllum oxypetalum* is one of the best known and widely cultivated of "broadleaf" cacti. Almost every farmhouse possesses this plant and because the farm wife gives it plenty of rich soil, water and fresh air, it usually grows exuberantly and flowers copiously. This more or less epiphytic cactus is also found in many city homes, where it got its start from a cutting received from a farm relative or friend. I saw this plant growing wild in a rain forest in Chiapas, Mexico, where it thrived among limestone rocks in rich humus with filtered sunlight streaming through the canopy overhead. By studying these natural conditions it is easy to learn the requirements the plant will need in cultivation.

*Epiphyllum oxypetalum*\* becomes a stout plant in age, up to six feet tall. The stems often become very long and terete, while the branches are flat and thin, long acuminate, often deeply crenate and over a foot in length. This cactus usually begins to flower in May, rests in July and resumes blooming in August and continuing into October. In the greenhouse the last flower may appear as late as November.

The flowers of *Epiphyllum oxypetalum* measure around 32 cm. in length and curve above the ovary. They, then, resemble a saxophone or Dutchman's pipe and are often known by these descriptive names. The flowers open in the evening but begin to droop shortly after dawn becoming limp after anthesis. They are fragrant to some extent. The flower tube may be 15 cm. long and about 1 cm. in diameter, purplish tinted, and bearing narrow greenish scales on its surface. The outer perianth segments are narrow, about 8-10 cm. long, light yellow brown to amber colored with a dash of red, while the inner perianth segments are pure white, equalling or smaller than the sepals but much broader. Stamens are numerous, the uppermost attached to the throat and the lower ones all along the inner wall of the flower tube, white with yellow anthers. The tube stamens are twice as long as those found attached to the throat, and all of them curve upward at the tips. The style is about 20-24 cm. long, 2-3 mm. thick, and supports 14-18, cream-colored stigma lobes, some of which may be forked.

Sventenius describes a new natural hybrid spurge, *Euphorbia Pettersoni*, in Boletín del Instituto Nacional de Investigaciones Agronomicas, Madrid, June, 1949, issue. The hybrid, discovered on the rocky declivity of Roque del Fraile in the Canary Islands, is a branching shrub, 16 to 20 inches high, with a woody trunk of ashy brown color, bearing short spatulate, concave, obtuse, smooth, bluish leaves and a terminal umbellate inflorescence. It flowers in February.

Two new *Monanthes* also came to my attention when back numbers of the above Boletín arrived at the Garden. Sventenius described these in the December, 1946, issue under the names of *Monanthes niphophila* and *M. dasyphylla*. The first one produces

rosettes 3-5 cm. in diameter. They are composed of thick, sub-rhomboid, obtuse leaves of glaucous green, and a short racemous, few-flowered inflorescence. It flowers from April until June. The plant grows in the fissures of vertical rocks on the Isle of Tenerife. The other is a stemless perennial with thick clubshaped leaves forming a dense rosette 2-5 cm. in diameter. The two to five flowered inflorescence arises from the axils of the outer leaves and is very red and pubescent. It was discovered on rocks of the Los Organos, near San Andres, on the Isle of Tenerife.

Eizi Matuda, long resident of Chiapas, has been investigating the flora of his Mexican state, with the hope of preparing an eventual "Flora of Chiapas" as his life-long ambition. His latest contribution, appearing in *The American Midland Naturalist* (43:195-233, Jan., 1950), has to do with the wild flora of Mt. Ovando, which is in the Soconusco District and where he enumerates 791 species and varieties in 476 genera. This annotated list includes a few succulents, such as *Talinum paniculatum*, found in secondary sandy growth; *Bryophyllum pinnatum* in dry thickets; and *Sedum Botterii* in wet forests on trees.

"Trees and Shrubs for Erosion Control in Southern California Mountains" by Jerome S. Horton, forest ecologist of the California Forest and Range Experiment Station, is an interesting bulletin that describes growth characteristics of trees and shrubs that have proven useful in erosion-control plantings. It also designates species that may be useful in landscape plantings and outlines methods used in establishing successful erosion-control plantings. *Yucca Whipplei*, the chaparral yucca, is recommended for both deep and shallow soils in full sun up to 7,000 feet. The plant is not browsed by deer nor are the plants often killed by fire. In fact, according to the report, large plants over 5 years old, when scorched by fire, are stimulated to immediate blooming.

Now that the convention is only a year off, cactus clubs ought to be thinking seriously of sending a delegate to the meeting in Denver in 1951. We would like to see every cactus club represented in an official capacity. Officers, devise a means to build up a fund and send a delegate to the fourth biennial convention.

Fernando Schmoll passed away after a lingering illness on May 24th last. He was in his seventy-first year. His widow, Carolina Schmoll, has operated La Quinta, the largest cactus establishment in Mexico for a quarter of a century. To her, the cactus world offers its sympathy.

Did you know that it takes approximately 27,000 seeds of *Yucca Whipplei* to make a pound?

## EXCHANGE POSTAGE STAMPS

Mr. E. Lamb, Franklin Road, Worthing, England, would like to contact someone interested in postage stamps to exchange with his son who is 15 years old.

\*For illustration see "Cacti for the Amateur," pg. 16.

# MEXICAN CACTI AND OTHER SUCCULENTS

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## BOOK NOTES

## NEW CACTUS BOOK

THE CACTUS GROWER'S GUIDE contains straightforward, practical instructions on the cultivation and propagation of these popular plants. Unlike most books on the subject, it describes not only the various types of Cacti, but also deals with other Succulent plants.

The knowledge and advice which Mrs. Higgins so freely gives in this volume are backed by twenty years experience and it is without doubt an indispensable manual for the beginner and expert alike. Not only is Mrs. Higgins a practical grower, she is also a botanist, and gives a clear account of the relationship between the various kinds of Cacti and Succulents and explains in simple terms how these plants are classified. This information is not usually readily available and such knowledge greatly simplifies a beginner's first steps in Cactus growing.

Imported from England. 120 pages cloth bound. Price \$1.25 postpaid. Order now from Abbey Garden Press, Box 101, Pasadena, California.

## RIO MAYO PLANTS

In 1942 the Carnegie Institution published "Rio Mayo Plants," a study of the flora and vegetation of the valley of the Rio Mayo, Sonora, by Howard Scott Gentry. The chapters on geography and vegetation are a most valuable supplement to the list of flora. The Cactaceae includes 52 plants some of which are first described here as new species. The list includes Agaves, Sedums, Echeverias, Euphorbias, etc., all of interest to students and botanists specializing in succulent plants. There are 327 pages and 29 plates; cloth bound. Price \$3.50 postpaid in the U. S. A.

*Button Gardens and How to Make Them* is the title of a 24-page booklet by Florence Wayne Casebolt. Miniature arrangements on buttons are becoming very popular especially for the cactophile whose plants are well adapted for this purpose. It is surprising how these gardens survive and the small colorful cuttings are never missed from your collection. Order a booklet and then test your originality. Order from Abbey Garden Press, price 50c postpaid.

*Cactus and Other Succulent Plants*—H. M. Roan. This reprint is now available bound in light board covers. This well illustrated 72 page book is written for the amateur and introduces one to many of the cacti and other succulents with advice on propagation and culture. Living room culture is explained thoroughly and a "month by month advice." Postpaid \$1.75.

## *Echinocereus oklabomensis* sp. nov. Lahman

Planta solitaria vel sparse caespiticia, ramis 10-16 cm. altis, 7-9 cm. diametro; costae 13-15; spinae 20-21, 5-15 mm. longae; flores purpureo-rubres, 8-11 cm. lati, stigmatis 14-21 viridis; areolae fructi et tubae floccosae, spinis longis gracilibus; fructus oblongus, viridus, seminibus nigris, minutis tuberculatis.

Plants usually single, caespitose with age; stems oblong, 10-16 cm. high, 7-9 cm. in greatest diameter; ribs 13-15, a perpendicular groove between them; spines 20-21, 5-15 mm. long; flowers bright purple-red, 8-11 cm. broad, stigmas 14-21, deep green. Areolae on the ovary and tube of the flower woolly, with long, dark, hair-like spines. The flowers come in May and June.

Type specimen in the Missouri Botanical Garden. Also similar specimens from the same locality were sent to the New York Botanical Garden and to the National Museum, Washington. Type locality, a rocky bank in the Wichita National Forest Reserve, Oklahoma.

Range: southwestern Oklahoma.

A description of this new cactus was published in the March, 1935, issue of the Cactus and Succulent Journal of America. It was included with *E. purpureus* and *E. albispinus*. These had Latin descriptions but through an oversight, the Latin to go with *E. oklabomensis*, was omitted. Now that omission is being corrected. In the meantime, *E. oklabomensis* was described, with photo, in the June, 1937, Cactus Journal of Great Britain. Also, the January, 1936, Nature Magazine carried photo and mention of *E. oklabomensis*.

## *Echinocereus longispinus* sp. nov. Lahman

Planta brevi-cylindrica, solitaria vel caespiticia, 4-13 cm. alta; 2-4 cm. diametro; costae 12-16, spinae 14-16, non aequiliter, 8-26 mm. longae; flos 5-8 cm. lati, segmentis perianthii roseis, spatulatis, crosis; stigmatis viridibus, 8; areolae fructi et tubae floccosae, spinis longis gracilibus; fructus oblongus, viridus, seminibus nigris, minutis tuberculatis.

Plant short-cylindric, sparsely caespitose with age, 4-13 cm. high.

Ribs 12-16 according to age; spines 14-16 unequal; 8-26 mm. long, upper short, hair-like.

Flowers 5-9 cm. broad, rose-pink shading to central white, centers deep red. Petals erose, spatulate. Ovary and tube white woolly with long, hair-like spines.

Fruit light green, seeds black, tubercled.

Range: pockets in disintegrated granite and on hill-sides and granite-strewn spaces in Medicine Park and Wichita National Forest Reserve, Oklahoma.

Type plants: In the Missouri Botanical Garden, the New York Botanical Garden and the National Museum, Washington, D.C.

Because of misunderstanding, a Latin description was omitted when *E. longispinus* was published as a new species in the March, 1936, issue of the Cactus and Succulent Journal of America. Also it was described in the Cactus Journal of Great Britain in June, 1937. This correction is now being made.



